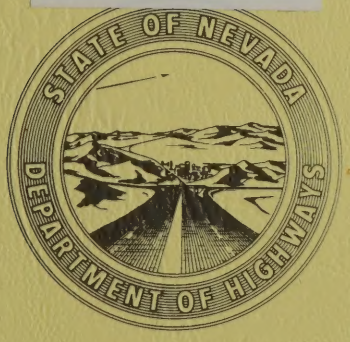
SUPPLEMENT NO. 1

TO

STATE OF NEVADA
DEPARTMENT OF HIGHWAYS

STANDARD SPECIFICATIONS

1968 EDITION



NDOT
TE180
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1968
Supplement 1

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Standard specifications for road and bridge construction, Supplement No. 1 / State of Nevada, Department of Highways.
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Certain amendments, revisions and additions to the "Standard Specifications", 1968 Edition have been adopted and shall hereafter be referred to as Supplement No. 1. The aforesaid amendments, revisions and additions are hereinafter contained and they shall supersede any conflicting provisions of the "Standard Specifications".

The amendments, revisions and additions contained in said Supplement No. 1 shall become effective on the 15th day of September, 1971.

Grant Bastian, P.E.
State Highway Engineer

By: Donald J. Crosby
Donald J. Crosby
Deputy State Highway Engineer

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SUPPLEMENT NO. 1

TO THE

STANDARD SPECIFICATIONS
(1968 Edition)

DIVISION 1

GENERAL REQUIREMENTS

SECTION 101 - DEFINITION AND TERMS

101.11 Contract Item (Pay Item). Change this subsection to read as follows:

An item of work specifically described and for which a price, either unit or Lump Sum, is provided. It includes the performance of all work and the furnishing of all labor, equipment, and materials described in the text of a specific item included in the contract or described in the Standard Specifications, Supplemental Specifications or Special Provisions of the contract. Contract items are numbered so that the first three digits of the item number corresponds to the section of the same number. Thus, in Item No. 203 0100, which is the item number for roadway excavation, the number 203 is the section number and corresponds to Section 203 of the Standard Specifications, Supplemental Specifications and Special Provisions.

Each contract item shall be constructed under the specifications contained in the section of the same number, i.e., the number preceding aforementioned last four digits.

101.25 Holidays. Change this subsection to read as follows:

In the State of Nevada, these occur on:

January 1 (New Year's Day)
Third Monday in February (Washington's Birthday)
Last Monday in May (Memorial Day)
July 4 (Independence Day)
First Monday in September (Labor Day)
Fourth Monday in October (Veterans' Day)
October 31 (Nevada Day)
Fourth Thursday in November (Thanksgiving Day)
December 25 (Christmas Day)

or on any day that may be appointed by the President of the United States or by the Governor of Nevada for Public fast, thanksgiving or as a legal holiday.

If January 1, July 4, October 31 or December 25 falls upon a Sunday, the Monday following shall be observed as a holiday.

If January 1, July 4, October 31 or December 25 falls upon a Saturday, the Friday preceding shall be observed as a holiday.

101.28 Major Contract Item. Change this subsection to read as follows:

A "Major Item" shall be construed to be any individual bid item included in the proposal that has a total cost equal to or greater than $50,000 or 5 percent of the total contract cost, whichever is the lesser amount. The total contract cost shall be computed on the basis of the proposal quantities and contract unit prices.

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS

102.03 Contents of Proposal Forms. Change the third paragraph of this subsection to read as follows:

The plans, specifications, supplemental notices to contractors and other documents designated in the proposal form will be considered a part of the proposal whether attached or not.

102.15 Motor Fuel Tax Refund. Change the last paragraph of this subsection to read as follows:

It shall be the Contractor's responsibility to determine that subcontractors have reported fuel consumption to the State of Nevada, Department of Motor Vehicles as required by law.

SECTION 103 - AWARD AND EXECUTION OF CONTRACT

103.02 Award of Contract. Modify the first paragraph of this subsection as follows:

In order to meet the requirement prescribed under Section 112 (c) of the Federal-aid Highway Act of 1958 (Title 23, United States Code) relative to the award of contract, each bidder shall furnish with his proposal a sworn statement executed by or in behalf of the person, firm, association or corporation submitting the bid. Such sworn statement shall be in the form appended to the Special Provisions and shall be sworn to before such persons as are authorized by the laws of the State to administer oaths.

SECTION 105 - CONTROL OF WORK

105.05 Cooperation by Contractor. Add the following:

Whenever the Contractor or his authorized representative is not present on any particular part of the work where it may be desired to give direction, orders will be given by the Engineer to the Contractor's superintendent, foreman, or other person in charge of the operation, who is present, and these orders shall have the same force and effect as if given to the Contractor or his designated representative.

Any order given by the Engineer, not otherwise required by the specifications to be in writing, will on request of the Contractor be given or confirmed by the Engineer in writing.

105.13 Load and Speed Restrictions. Change the last sentence of the second paragraph of this subsection to read as follows:

Unless otherwise stated in the Special Provisions, the maximum loads shall not exceed the limits set forth in Chapter 484 of the Nevada Revised Statutes and all acts amendatory thereto or supplementary thereof.

The limitations, (b, c, d, e, f, i) as listed in this subsection of the Standard Specifications may be waived for all Reinforced Concrete Box Culverts providing that the depth of fill compacted and in place over the Reinforced Concrete Box Culvert is equal to or greater than the distance between inside faces of outside walls measured along center line of roadway. Fill may be placed not to exceed profile grade elevation.

SECTION 106 - CONTROL OF MATERIAL

106.02 Local Materials. Add the following:

Aggregates for base, surface and concrete may be the products of approved commercial producers, provided they meet specification requirements.

Change the last sentence of the third paragraph of this subsection to read as follows:

Generally deposits other than those indicated in the "Materials Information" packet will not be approved if located within one thousand (1,000) feet of right-of-way line. In any case the Contractor's pit operations shall not encroach within twenty-five (25) feet of highway right of way. Payment will not be made on material obtained in violation of these provisions.

106.03 Possible Local Material Sources. Delete the first paragraph of this subsection and substitute the following:

If the Contractor desires to use materials from sources other than those described in the "Materials Information", as referred to in subsection 102.05, "Examination of Plans, Specifications, Contract Documents, and Site of Work", he shall, at his own expense, acquire the necessary right to take material and shall obtain all other necessary permits and approvals and shall comply with all the requirements and stipulations in effect by other governing agencies having jurisdiction over the area, and pay all costs involved, including any which may result from an increase in length of haul. All costs of exploring and developing such alternate sources shall be borne by the Contractor and the use of material from

such sources will not be permitted until representative samples taken by the Engineer have been approved and written authority issued for the use thereof.

Should such alternate source be located on U.S. Government owned land, the Department, upon written request from the Contractor, will make application for the right to remove materials therefrom, by grant or otherwise, provided the Department has first approved the area as a possible source of local materials. The Department will also submit the required mining plan. In making such application for the Contractor, the Department does not guarantee the use of the material from the area involved will be free of charge to the Contractor. Such costs, if any, shall be paid by the Contractor.

The Contractor's attention is especially directed to the new Part 23 of Title 43 Code of Federal Regulations titled "Surface Exploration, Mining and Reclamation of Lands" which pertains to all exploration, developing and obtaining material from said alternate deposits located upon land under the jurisdiction of the Bureau of Land Management. A pertinent portion of this Part 23 follows:

§ 23.8 Approval of mining plan.

(a) (1) Before surface mining operations may commence under any permit or lease issued under the mineral leasing acts the operator must file a mining plan with the mining supervisor and obtain his approval of the plan. Paragraphs (b) through (g) of this section confer authority upon mining supervisors with respect to mining plans pertaining to permits or leases issued under the mineral leasing acts. The mining supervisor shall consult with the district manager with respect to the surface protection and reclamation aspects before approving said plan.

(2) Before surface mining operations may commence under any permit issued or contract made under the Materials Act, the operator must file a mining plan with the district manager and obtain his approval of the plan. Paragraphs (b) through (g) of this section confer authority upon district managers with respect to mining plans pertaining to permits issued or contracts made under the Materials Act.

(b) Depending on the size and nature of the operation and the requirements established pursuant to §23.5, the mining supervisor of the district manager may require that the mining plan submitted by the operator include any or all of the following:

(1) A description of the location and area to be affected by the operations;

(2) Two copies of a suitable map, or aerial photograph showing the topography, the area covered by the permit, lease, or contract, the name and location of major topographic and cultural features, and the drainage plan away from the area to be affected;

(3) A statement of proposed methods of operating, including a description of proposed roads or vehicular trails; the size and location of structures and facilities to be built;

(4) An estimate of the quantity of water to be used and pollutants that are expected to enter any receiving waters;

(5) A design for the necessary impoundment, treatment or control of all runoff water and drainage from workings so as to reduce soil erosion and sedimentation and to prevent the pollution of receiving waters;

(6) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, damage to fish and wildlife, and hazards to public health and safety; and

(7) A statement of the proposed manner and time of performance of work to reclaim areas disturbed by the holder's operation.

(c) In those instances in which the permit, lease, or contract requires the revegation of an area of land to be affected the mining plan shall show:

(1) Proposed methods of preparation and fertilizing the soil prior to replanting;

(2) Types and mixtures of shrubs, trees, or tree seedlings, grasses or legumes to be planted; and

(3) Types and methods of planting, including the amount of grasses or legumes per acre, or the number and spacing of trees, or tree seedlings, or combinations of grasses and trees.

(d) In those instances in which the permit, lease, or contract requires regrading and backfilling, the mining plan shall show the proposed methods and the timing of grading and backfilling of areas to be affected by the operation.

(e) The mining supervisor or the district manager shall review the mining plan submitted to him by the operator and shall promptly indicate to the operator any changes, additions, or amendments necessary to meet the requirements formulated pursuant to 23.5, the provisions of the regulations in this part and the terms of the permit, lease, or contract. The operator shall comply with the provisions of an approved mining plan.

(f) A mining plan may be changed by mutual consent of the mining supervisor or the district manager and the operator at any time to adjust to changed conditions or to correct any oversight. To obtain approval of a change or supplemental plan the operator shall submit a written statement of the proposed changes or supplement and the justification for the changes proposed. The mining supervisor or the district manager shall promptly notify the operator that he consents to the proposed changes or supplement or, in the event he does not consent, he shall specify the modifications thereto under which the proposed changes or supplement would be acceptable. After mutual acceptance of a change of a plan the operator shall not depart therefrom without further approval.

(g) If circumstances warrant, or if development of a mining plan for the entire operation is dependent upon unknown factors which cannot or will not be determined except during the progress of the operation, a partial plan may be approved and supplemented from time to time. The operator shall not, however, perform any operation except under an approved plan.

§ 23.9 Performance bond.

(a) (1) Upon approval of an exploration plan or mining plan, the operator shall be required to file a suitable performance bond of not less than $2,000 with satisfactory surety, payable to the Secretary of the Interior, and the bond shall be conditioned upon the faithful compliance with applicable regulations, the terms and conditions of the permit, lease, or contract, and the explorations or mining plan as approved, amended or supplemented. The bond shall be in an amount sufficient to satisfy the reclamation requirements of an approved exploration or mining plan, or an approved partial or supplemental plan. In determining the amount of the bond consideration shall be given to the character and nature of the reclamation requirements and the estimated costs of reclamation in the event that the operator forfeits his performance bond.

(2) In lieu of a performance bond an operator may elect to deposit cash or negotiable bonds of the U. S.

Government. The cash deposit or the marker value of such securities shall be equal at least to the required sum of the bond.

(b) A bond may be a nationwide or statewide bond which the operator has filed with the Department under the provisions of the applicable leasing regulations in Subchapter C of Chapter II of this title, if the terms and conditions thereof are sufficient to comply with the regulations in this part.

(c) The district manager shall set the amount of a bond and take the necessary action for an increase or for a complete or partial release of a bond. He shall take action with respect to bonds for leases or permits only after consultation with the mining supervisor.

(d) Performance bonds will not be required of Federal, State or other governmental agencies. Where the exploration or mining is actually performed for such Federal, State, or governmental agencies by a Contractor who would have to post a bond under the terms of paragraph (a) of this section if he were the operator, such agencies shall require the Contractor to furnish a bond payable to the United States which meets the requirements of paragraph (a) of this section. If, for some other purpose, the Contractor furnishes a performance bond, an amendment to that bond which meets the requirements of paragraph (a) of this section will be acceptable in lieu of an additional or separate bond.

106.04 Samples and Tests. (h) Add the following:

Where less than eighty percent of the asphalt deliveries are used on the project, samples shall be taken just prior to delivery to the mixer. Samples shall be taken for every 25 tons of asphalt delivered to the project.

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.14 Disposal of Material Outside Highway Right of Way. Add the following to the second paragraph of this subsection:

Such disposal sites will not be approved when located within one thousand (1,000) feet of a State highway right of way if the material placed thereon can be seen from said highway.

SECTION 108 - PROSECUTION AND PROGRESS

108.08 Determination and Extension of Contract Time. (c) Add the following:

Certain critical materials such as steel, copper and aluminum may be difficult to obtain due to defense needs. The Contractor shall make

every reasonable effort necessary to order and procure all such critical materials sufficiently in advance so as not to delay the completion of the project. Should a delay occur in obtaining critical materials that were properly ordered by the Contractor, the time for completion of the contract shall be extended an amount determined by the Engineer to be equivalent to the delay in project progress due to said delay in obtaining critical materials provided that:

(1) The delay in furnishing critical materials was due to defense needs.

(2) That (1) is properly certified to by the supplier.

108.09 Failure to Complete Work on Time. Change the last paragraph of this subsection to read as follows:

The Department will waive such portions of the liquidated damages as may accrue after all work, except for that of seeding deposit areas and haul roads and that set forth in subsection 104.06 of the Standard Specifications as "Final Clean Up", is completed.

Add the following subsection:

108.13 National Emergency and Termination of Contract. The State may, by written notice, with the approval of the Federal Highway Administration where applicable, terminate the contract or a portion thereof when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the prosecution of war or in the interest of national defense.

When contracts, or any portion thereof, are terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract unit price, or as mutually agreed for items of work partially completed or not started. No claim for loss of anticipated profits shall be considered.

Reimbursement for organization of the work (when not otherwise included in the contract) and moving equipment to and from the job will be considered where the volume of work completed is too small to compensate the Contractor for these expenses under the contract unit prices, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained by the Contractor for the work, that have been inspected, tested, and accepted by the Engineer, and that are not incorporated in the work may, at the option of the Engineer, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Engineer.

Termination of a contract or a portion thereof shall not relieve the Contractor of his responsibilities for the completed work, nor shall it relieve his surety of its obligation for and concerning any just claims arising out of the work performed.

SECTION 109 - MEASUREMENT AND PAYMENT

109.01 Measurement of Quantities. Following the tables on Page 90 add the following paragraph:

When converting the volume of liquid asphalt, asphalt cement or asphaltic emulsion at any temperature to the volume at sixty (60) degrees F. a conversion factor for correlation shall be used. Said conversion factors shall be those prescribed in "The Asphalt Institute (Pacific Coast Division)" publication of "Specification Tables and Uses", dated February 1955, and revised January 1966.

109.02 Scope of Payment. Change the footnote following the schedule of demerits for bituminous materials on page 94 to read as follows:

*Material shown by test to have 21 or more demerits shall be removed and replaced or, at the option of the Engineer, may be left in place. Payment for such material left in place will be assessed liquidated damages at $16.00 per ton. Material removed will not be paid for and the removal thereof will be at the Contractor's expense.

109.03 Extra and Force Account Work. Following the second paragraph of this subsection add the following:

1. Specialized Work:

Whenever the Contractor is required to perform minor, originally unanticipated work of a specialized nature (Electrical, Plumbing, Landscaping, etc.,) for which he is not properly equipped, he may upon approval of the Engineer have the work performed by a local firm or specialist who is proficient in the type of work to be performed.

Payment for this work shall be the Contractor's actual cost as evidenced by copies of invoices from the person or firm who performed the work. To the Contractor's actual cost shall be added the sum of 10 percent for the Contractor's profit and overhead with no further compensation therefore.

2. Owner-Operators:

Whenever the Contractor is authorized by the Engineer to utilize bonafide owner-operators on Force Account work, payment shall be at the lump sum rate shown on the Contractor's payrolls which includes wages and equipment rental. To this lump sum rate shall be added the sum of 10 percent for the Contractor's profit and overhead with no further compensation therefore.

(a) Labor.

2. Labor Surcharge. Change this paragraph to read as follows:

(a) Labor Surcharge: To the actual wages, plus vacation pay, as defined above will be added a labor surcharge of eleven and one-quarter (11.25) percent, which labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws.

(b) Fringe Benefits: To the sum of paragraph "1. Actual Wages Plus Vacation Pay", and (a) above, shall be added all other payments made to or on behalf of the workmen as required by collective bargaining agreements, or as otherwise provided in these provisions.

(c) Equipment. Change the five (5) percent in the last sentence in this subparagraph to ten (10) percent.

(f) Documentation.

2. Materials. Change the first sentence of this paragraph to read as follows:

Copies of the suppliers invoices, including transportation charges, shall be furnished the Engineer.

109.06 Partial Payment. Following the second paragraph of this subsection add the following:

The cost of materials conforming to the plans and specifications ("materials" being those which are required to be contained and incorporated in a finished contract bid item) delivered to the project and not at the time incorporated in the work, may also be included in the estimate for partial payment.

No such estimate or payment shall be construed to be an acceptance of any defective work or improper material.

The Contractor shall be responsible for, and shall not remove from the project any material that has been included in the estimate for payment.

(f) Schedule of Payments. Add the following:

6. Not more than eighty-five (85) percent of the quantity of Selected Material Base conforming to all the requirements, in windrow may be allowed.

Paragraph "(a) Watering" on Page 99 shall be deleted.

No payment, partial or otherwise, will be made for the item of "Watering". Full compensation for developing and maintaining an adequate water supply will be considered included in other items of work.

Paragraph "(c) Barricades" on page 100 change to read as follows:

When barricades are placed on the project in accordance with the plans and specifications, fifty (50) percent of the contract bid price per linear foot or per each (as the case may be) of the barricades thus in use will be paid for on the next monthly estimate after placing. The remaining percent will be prorated in accordance with job progress. However, if barricades become inadequate for job requirements in the opinion of the Engineer, an adjustment downward shall be made on the first monthly estimate following such inadequacy.

Change the second paragraph on Page 100 to read as follows:

Partial payments will be made on the items of fence, guardrail, bridge rail, mobilization, signal systems and/or highway lighting systems, cattle guards and trenching for irrigation systems as hereinafter noted provided that materials and equipment are supplied to the satisfaction of the Engineer.

(a) Fence. Add the following: The cost of wire and posts conforming to the plans and specifications which are required to be contained and incorporated in a finished contract bid item delivered to the project and not at the time incorporated in the work, may be included in the estimate for partial payment.

(b) Guardrail and Bridge Rail. Add the following: When posts for guardrail or reconstruct guardrail are complete in place, 50% of the contract bid price per foot will be eligible for payment.

(c) Mobilization. Partial payments will be made in accordance with the following schedule:

1. When 5% of the original contract amount is earned, 25% of the amount bid for mobilization, or 2-1/2% of the original contract amount, whichever is lesser, will be allowed on the next monthly estimate.

2. When 10% of the original contract amount is earned, 50% of the amount bid for mobilization, or 5% of the original contract amount, whichever is lesser, will be allowed on the next monthly estimate.

3. When 25% of the original contract amount is earned, 60% of the amount bid for mobilization, or 6% of the original contract amount, whichever is lesser, will be allowed on the next monthly estimate.

4. When 65% of the original contract amount is earned, 90% of the amount bid for mobilization, or 9% of the original contract amount, whichever is lesser, will be allowed on the next monthly estimate.

5. When 80% of the original contract amount is earned, 100% of the amount bid for mobilization or 10% of the original contract amount, whichever is lesser, will be allowed on the next monthly estimate.

6. Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 10% of the original contract amount will be allowed on the next estimate.

(d) Signal Systems and/or Highway Lighting Systems. The cost of materials for luminaires, poles and mast arms, controllers and cabinets, signal heads and detector units, conforming to the plans and specifications ("materials" being those which are required to be contained and incorporated in a finished contract bid item) delivered to the project and not at the time incorporated in the work, may also be included in the estimate for partial payment. Other items will not be included for partial payment until incorporated in the work.

(e) Cattle Guards. The first monthly estimate after the cattle guard has been completed, but the wings not yet installed, will show this item ninety (90) percent complete.

The remaining ten (10) percent shall be eligible for payment on the first monthly estimate after the wings have been installed.

(f) Trenching for Irrigation Systems. When trenches for irrigation pipe distribution lines have been excavated and the pipe has been placed but not backfilled, 75% of the partially completed irrigation pipe will be eligible for payment on the next monthly estimate at the contract unit price. Payment will be based on that length of the pipe partially complete.

The remaining 25% will be eligible for payment on the first monthly estimate following complete installation of the pipe.

SECTION 110 - WAGES AND CONDITIONS OF EMPLOYMENT

110.01 Description. Add the following:

The laborers shall have access to the pertinent minimum wage schedules at all times. The Contractor shall provide and erect a weatherproof bulletin board at the job site and post all minimum wage schedules and other required information thereon. The weatherproof bulletin board shall be so constructed that the material thereon is adequately protected from the elements. The cost of providing and erecting the weatherproof bulletin board shall not be measured or paid for directly but shall be considered as included in the contract bid price paid for other items of work.

110.02 Laws Cited. Add the following:

(i) Fraudulent and Discriminatory Employment Practices - Nevada Revised Statutes, Chapter 613.

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DIVISION II

SECTION 203 - EXCAVATION AND EMBANKMENT

MATERIALS

Add the following subsection:

203.02.05 Selected Borrow. Selected borrow shall consist of approved material required for the construction of embankments within the required limits shown on the plans or directed by the Engineer, and shall be obtained from approved sources.

Selected borrow shall conform to the requirements set forth in the Special Provisions.

203.03.17 Compaction, Dirt Embankment. Change the first paragraph of this subsection to read as follows:

Optimum moisture content of the various soils will be determined by the Engineer. At the time of compaction, the moisture content of the various soils shall be within the following ranges:

Optimum Moisture Content	Tolerances
0 - 20%	+ 2% to - 4%
20% - 30%	+ 2% to - 5%
31% or more	+ 3% to - 6%

When necessary, each layer before being compacted, shall be processed as required in order to bring its moisture content within the prescribed limits. The material shall be wetted by the application of water or dried as necessary and either process may be carried out either on the embankment or at the source of the material or otherwise as approved by the Engineer. Full compensation for any work involved in wetting or drying embankment material to obtain the required moisture content shall be considered as included in the contract unit price bid for excavating or furnishing the material and no additional compensation will be allowed therefor.

Hauling and leveling equipment shall be routed and distributed full width over each layer of the fill in such a manner as to uniformly distribute the compaction afforded thereby. In addition to hauling and leveling equipment, the Contractor shall provide compaction equipment that is specifically designed and manufactured for the purpose of compacting dirt embankments. Said compaction equipment shall work continuously with the grading equipment.

Add Test Method Nev. T103 to the test methods referred to in the second paragraph of this subsection.

The requirement contained in the third paragraph of this subsection of the Standard Specifications that roadway embankment material and structure backfill placed within one hundred (100) feet of bridges be compacted to not less than ninety-five (95) percent maximum density is hereby deleted and the following substituted therefore:

All selected borrow and structure backfill placed within the limits of embankments shown on the plans for approaches to bridges shall be compacted to not less than ninety-five (95) percent of the maximum density as determined by Test Method Nev. T101. Test Method Nev. T102 or Nev. T103 may be used to determine the in-place density. Test method to be determined by the Engineer.

203.04.01 Measurement. Add the following:

The quantity of Selected Borrow or Selected Borrow Excavation to be measured for payment will be the number of cubic yards or tons measured as set forth in the Special Provisions.

203.05.01 Payment. Add the following:

The accepted quantities of selected borrow or selected borrow excavation will be paid for at the contract unit price bid per cubic yard or ton for "Selected Borrow" or "Selected Borrow Excavation" which price shall be full compensation for furnishing all materials, loading, hauling, depositing, spreading, watering, compacting and maintaining the material complete and in place.

Payment will be made under:

Pay Item	Pay Unit
Selected Borrow	Cubic Yard or Ton
Selected Borrow Excavation	Cubic Yard or Ton

SECTION 204 - ROUNDED AND TRANSITION SLOPES

204.04.01 Measurement. Change the first paragraph of this subsection to read as follows:

The quantity of rounded cut slopes or roadway ditch slopes to be paid for shall be measured in linear feet of slopes, treated as specified, measured along the roadway ditch each side of the roadway centerline. The quantity of rounded embankment slopes to be paid for shall be measured in linear feet, treated as specified, measured along the center line of the embankment to be rounded, and each side shall be considered separately. In all cases, each one hundred (100) feet shall constitute the unit of one station. Earthwork quantities within the limits of "Slope Rounding" will not be measured for payment.

SECTION 206 - STRUCTURE EXCAVATION

206.03.01 General. Add Test Method Nev. T103 to the test methods referred to in the third paragraph of this subsection.

SECTION 207 - BACKFILL

207.02.02 Granular Backfill. Change the last paragraph of this subsection to read as follows:

The liquid limit of the material shall not be greater than thirty-five (35) and the plasticity index shall not be more than ten (10).

207.03.01 General. Change the second paragraph of this subsection to read as follows:

Unless otherwise permitted by the Engineer, foundations for culvert pipe and reinforced concrete boxes shall be compacted to ninety (90) percent of the maximum density as determined by Test Method Nev. T101. Test Method Nev. T102 or Nev. T103 may be used to determine the in-place density. Test Method to be determined by the Engineer.

Change the third paragraph of this subsection to read as follows:

Backfill material shall be placed in uniform horizontal layers not exceeding eight (8) inches in loose thickness before compaction and shall be brought up uniformly on all sides of the structure or improvement. Each layer of backfill shall be moistened as necessary and thoroughly tamped until ninety (90) percent of the maximum density is achieved, except that each layer of backfill so placed within the limits shown on the plans for selected borrow embankments for approaches to bridges shall be thoroughly compacted until ninety-five (95) percent of the maximum density is achieved. In all instances, Test Method Nev. T101, Nev. T102 or Nev. T103 may be used to determine the in-place density. Test Method to be determined by the Engineer.

SECTION 208 - FOUNDATION FILL

208.03.01 General. Add Test Method Nev. T103 to the test methods referred to in the third paragraph of this subsection.

SECTION 209 - DRAIN BACKFILL

209.03.01 Underdrains. Add Test Method Nev. T103 to the test methods referred to in the third paragraph of this subsection.

SECTION 210 - WATERING

210.03.01 Equipment. Add the following:

The department does not require that watering equipment be provided with measuring or metering devices.

210.04.01 Measurement. Change this subsection to read as follows:

The developing of an adequate water supply, the furnishing of all necessary equipment for obtaining water from the source or sources, water, and the furnishing of equipment necessary to apply the water, will not be measured for payment.

210.05.01 Payment. Change this subsection to read as follows:

Full compensation for developing an adequate water supply, for furnishing all necessary equipment, for obtaining water from the source or sources, for water, and for furnishing of equipment necessary to apply the water, shall be considered as included in the contract unit price paid for other appropriate items and no separate payment will be made therefor.

SECTION 213 - IRRIGATION SYSTEMS

213.01.01 General. Add the following:

This work shall also consist of furnishing and installing asbestos cement pipe conduit for future irrigation systems as shown on the plans and as specified herein.

213.02.02 Pipe and Fittings. Add the following:

Asbestos cement pipe conduit shall be Type II, Class 2400 asbestos cement pipe conforming to the requirements of ASTM Designations: C 428 and C 644 and shall be of the size shown on the plans.

Asbestos cement pipe conduit shall be bedded and backfilled with sandy material as shown on the plans. Material used for bedding and backfilling of asbestos cement pipe conduit shall consist of natural sand or a mixture of sand with gravel, crushed gravel, crushed stone, or other broken or fragmented material to fill the voids in the coarser material. In addition thereto, the material shall conform to the following requirements:

Sieve Sizes	Percentage by Weight Passing Sieve
3/8 Inch	100
No. 200	0-15

213.03.07 Installation. Add the following:

Asbestos cement pipe conduit shall be installed as shown on the plans and the ends of the conduit shall be marked with "T" post markers and shall be capped by a nonpermanent cap that will prevent the conduit from being filled.

213.05.01 Payment. Add the following:

Payment per linear foot of conduit involved shall be full compensation for furnishing and installing pipe conduit, bedding and backfilling, caps, markers, and incidentals necessary to install the conduit complete in place.

SECTION 301 - SELECTED MATERIAL BASE OR SURFACE

301.03.04 Compaction. Add Test Method Nev. T103 to the test methods referred to in the first paragraph of this subsection.

SECTION 302 - AGGREGATE BASE COURSES

302.03.06 Compaction. Add Test Method Nev. T103 to the test methods referred to in the first paragraph of this subsection.

302.04.01 Measurement. Add the following:

Where the plans indicate that an allowance has been made for moisture said allowance is for estimating purposes only and the actual amount of moisture to be included in the measurement of aggregate base shall be the amount measured as set forth in this subsection of the Standard Specifications.

SECTION 304 - PORTLAND CEMENT TREATED BASE

304.03.01 Proportioning. Change the test method referred to in this subsection to read Test Method No. Nev. T239.

304.03.05 Compaction. Add Test Method Nev. T103 to the test methods referred to in the last paragraph of this subsection.

304.03.09 Protection and Curing. Add the following:

The curing seal shall be applied as soon as possible, but not later than twenty-four (24) hours after the completion of final rolling.

SECTION 401 - PLANTMIX BITUMINOUS PAVEMENTS - GENERAL

401.02.01 Composition of Mixtures. Change the Bitumen Content tolerance, percent of volume or batch weight of aggregate in the job-mix formula from ±0.3% to ±0.4%.

Change the sixth, seventh, eighth and ninth paragraph of this subsection to read as follows:

The temperature of the bituminous material just prior to mixing, and the completed mixture at the point of discharge shall conform to the following tables:

Plantmix Bituminous Base or Surface Mixtures with Asphalt Cement

Grade of Asphalt Cement	Pugmill Mixing Temperatures Minimum	Maximum
40-50	275	350°F
60-70	265	330°F
85-100	255	325°F
120-150	245	325°F
200-300	225	300°F

Plantmix Bituminous Open-Graded Mixtures with Asphalt Cement

Grade of Asphalt Cement	Pugmill Mixing Temperature of Bituminous Material Minimum	Maximum	Pugmill Mixing Temperature of Completed Mixture Minimum	Maximum
40-50	275	350°F	225	290°F
60-70	265	330°F	225	285°F
85-100	255	325°F	225	280°F
120-150	245	325°F	225	280°F
200-300	225	300°F	225	280°F

Plantmix Bituminous Mixtures with Liquid Asphalts

Grade and Type MC and SC	Pugmill Mixing Temperatures Minimum	Maximum
70	95	140°F
250	135	175°F
800	165	205°F
3000	200	240°F

The completed mixture of the above items at the hopper of the paver shall not be more than twenty (20) degrees below the specified minimum pugmill mixing temperature.

The last paragraph of this subsection of the Standard Specifications is hereby changed to read as follows:

Attention is directed to subsection 106.04, "Samples and Tests".

401.02.03 Commercial Mineral Filler. This subsection of the Standard Specifications is hereby changed to read as follows:

Commercial mineral filler shall meet the requirements of subsection 705.03.04, "Commercial Mineral Filler".

401.03.03 Pavers. Change the last paragraph of this subsection to read as follows:

The screed shall be equipped with automatic controls which will make adjustments in both transverse and longitudinal direction. The external longitudinal reference devices used to pick up grade information for the automatic sensing control shall conform to the following requirements:

1. When picking up grade information from an underlying base, the external longitudinal reference device shall not be less than thirty (30) feet in length. The devices for averaging the high and low spots over a minimum thirty-foot span shall be a floating beam or a long ski. The use of a mobile string line such as a rigid truss equipped with wheels on each end will not be permitted.

2. When picking up grade information from an adjacent pavement course or a concrete surface, the external longitudinal reference device shall not be less than ten (10) feet in length.

Sensing grids or shoes for monitoring the grade information from these longitudinal reference devices shall ride approximately in the middle portion. The pathways for the external reference devices shall be kept clear of pebbles, debris and any other obstruction that might affect the pavement surface.

Should the automatic controls fail to function properly, the Engineer may permit the Contractor to finish the half shift with manual controls. Operations shall not resume until the controls are repaired.

401.03.04 Rollers. (b) Add the following to this subparagraph of this subsection:

The use of pneumatic-tired rollers with a lesser number of wheels and a greater maximum operating weight per tire than that specified in this subsection of the Standard Specifications will be permitted subject to the following requirements:

1. The minimum width between the outer edge of the outside tires on a given axle shall be sixty (60) inches.

2. The weight of the roller and the tire pressure can be varied to produce a ground contact pressure between 50-70 PSI.

401.03.10 Spreading and Finishing. Delete the provision that open-graded plantmix cannot be windrowed in advance of the spreading and finishing machine as set forth in the last paragraph of this subsection.

SECTION 405 - TACK COAT

405.03.04 Application of Bituminous Materials. Change the temperature requirements pertaining to the application of asphaltic emulsion in the first paragraph of this subsection as follows:

When asphaltic emulsion is used, the temperature at the time of application shall conform to the applicable requirements in Table I of subsection 406.03.04 of Section 406, "Prime Coat".

SECTION 406 - PRIME COAT

406.03.04 Application of Bituminous Material. Change the temperature requirements pertaining to the application of liquid asphalts and asphaltic emulsion as follows:

TABLE I

Spraying and Mixing Temperatures of Liquid Asphalts and Asphaltic Emulsions.

Grade and Type RC, MC and SC	Distributor Spraying Temp. °F Minimum	Maximum	*Pugmill Mixing Temp. °F of Liquid Asphalts MC and SC Minimum	Maximum
70	120	180	95	140
250	165	220	135	175
800	200	255	165	205
3000	235	290	200	240

*The maximum spraying temperature may be used if the aggregate is not heated.

Grade of Asphalt Emulsion	Distributor Spraying Temp. °F Minimum	Maximum	*Pugmill Mixing Temp. °F of Emulsion and Aggregates Minimum	Maximum
RS-1, CRS-1	75	130	(Not used for Mixing)	
RS-2, CRS-2	110	160	"	"
SS-1, CSS-1	75	130	50	130
SS-1h, CSS-1h	75	130	50	130
CMS-2S	100	160	60	140

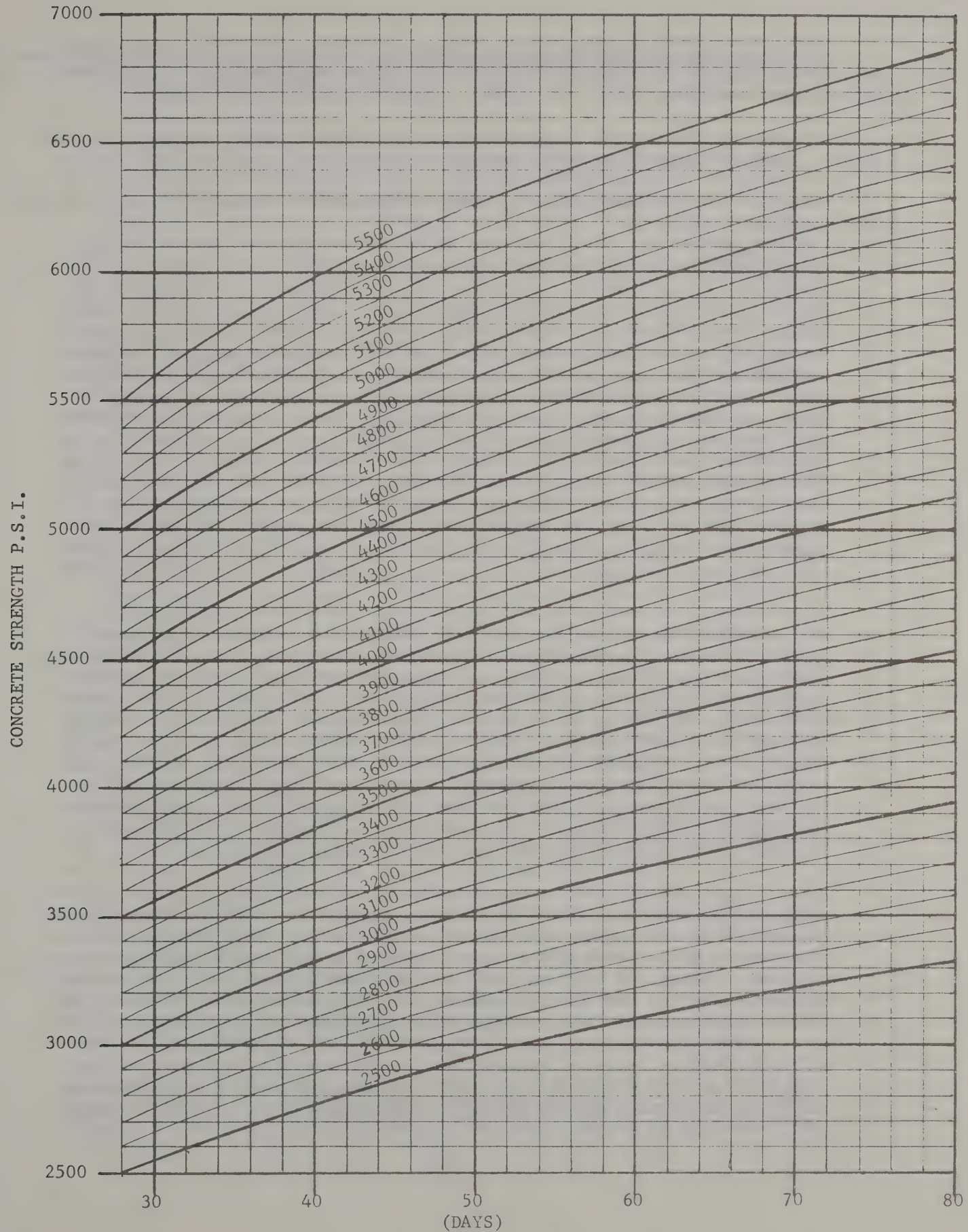
*The maximum spraying temperature may be used if the aggregate is not heated.

SECTION 408 - SURFACE TREATMENT

408.02.02 Screenings. Change the reference in this subsection from 705.03.04 to 705.03.05.

SECTION 501 - PORTLAND CEMENT CONCRETE

501.02.04 Concrete Making Properties. Delete Chart No. 1 as it appears on Page 314 and substitute the following Chart No. 1 therefor.


7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
CONCRETE STRENGTH P.S.I.
5500
5400
5300
5200
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4300
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3700
3600
3500
3400
3300
3200
3100
3000
2900
2800
2700
2600
2500
30
40
50
60
70
80
(DAYS)

CHART NO. 1

501.03.04 Classifications and Proportions. Change the maximum amount of water per sack of cement as indicated in Table 1 of this subsection for "Class BA Concrete" to 6 gallons per sack.

Change 3-5 percent air range for Class AA, BA, CA and DA Concrete as shown in Table 1 of this subsection to 4-7 percent.

Change 1-5 inch slump range for Class D Concrete as shown in Table 1 of this subsection to 1-4 inches.

501.03.09 Curing. (c) Curing Compound Method. Add the following:

All Portland Cement Concrete Pavement shall be cured with a white pigmented curing compound. White pigmented curing compound shall conform to the requirements of subsection 702.03.01, except as modified herein. Surfaces of the concrete which are exposed to the air, shall be sprayed uniformly with either white pigmented chlorinated rubber curing compound, or white pigmented curing compound at the option of the Contractor. The rate of application of white pigmented curing compound, at any point, shall be, 1 gallon per 200±50 sq. ft. and the average rate of application shall be, 1 gallon per 200±25 sq. ft. The rate of application for white pigmented chlorinated rubber curing compound, at any point, shall be, 1 gallon per 250±50 sq. ft. and the average rate of application shall be, 1 gallon per 250±25 sq. ft. Power operated spraying equipment for application of curing compound, shall be equipped with an operational pressure gauge and means of controlling the pressure.

All surface finishing of the concrete shall be completed before application of the curing compound. The compound shall be applied immediately after the moisture sheen begins to disappear from the surface; but, before any drying shrinkage or craze cracks begin to appear. In the event of any delay in the application of curing compound application of water with an atomizing nozzle as specified in subsection 501.03.09(b), water method of the Standard Specifications, shall be started immediately and shall be continued until the application of the compound is resumed or started. Should the film of compound be damaged from any casues before the expiration of 72 hours after the concrete is placed, the damaged portion shall be repaired immediately with additional compound.

All curing compounds shall remain sprayable at temperatures above 40 degrees F. and shall not hard settle in storage. They shall not be diluted or altered in any manner after manufacture. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. If the compound has not been used within 120 days after the date of manufacture, the Engineer may require additional testing before use, to determine compliance to requirements.

An anti-settling agent or combination of anti-settling agents shall be incorporated in the curing compound to prevent caking and excessive settling of the pigment in the package. The total amount of anti-settling

agent used shall not exceed 5.0 pounds per 100 gallons of the curing compound. There shall be no caking or excessive settling of the pigment in the package that cannot be readily redispersed with a paddle.

Curing compound may be sampled by the Engineer at the source of supply and at the jobsite. Each container of a packaged compound shall be clearly labeled showing the date of manufacture and date of shipment, the manufacturer's name and batch number, and the type of compound.

Portland Cement Concrete bridge decks that are to be the roadway surfaces shall be cured with a White Pigmented Curing Compound--Chlorinated Rubber Base conforming to the requirements of Section 702 of these Supplemental Specifications. The area to be treated shall be the top surface of concrete bridge decks except that care shall be exercised to keep the compound off all parapets or other surfaces which are to receive a "Fine Surface Finish ("FSF")" as specified on the plans. All other concrete surfaces shall be cured in accordance with this subsection of the Standard Specifications.

The rate of application of the Chlorinated Rubber Base type, at any point, shall be one gallon per 250 ± 50 square feet and the average rate of application shall be one gallon per 250 ± 25 square feet. Power operated spraying equipment for application of curing compound shall be equipped with an operational pressure gage and means of controlling the pressure.

The curing compound shall be applied to the top surface of concrete bridge decks following the surface finishing operation immediately after the moisture sheen begins to disappear from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any delay in the application of curing compound, which could result in any drying or cracking of the surface, application of water with an atomizing nozzle as specified in subsection 501.03.09(b) Water Method, of the Standard Specifications, shall be started immediately and shall be continued until application of the compound is resumed or started; however, the compound shall not be applied over any resulting free standing water. Should the film of compound be damaged from any cause before the expiration of seven (7) days after the concrete is placed, the damaged portion shall be repaired immediately with additional compound.

Curing compound shall remain sprayable at temperatures above 40° F. and shall not hard settle in storage. The compound shall not be diluted or altered in any manner after manufacture. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. If the compound has not been used within 120 days after the date of manufacture, the Engineer may require additional testing before use, to determine compliance to requirements.

An anti-settling agent or combination of anti-settling agents shall be incorporated in the curing compound to prevent caking and excessive settling of the pigment in the package. The total amount of anti-settling

agent used shall not exceed 6.0 pounds per 100 gallons of the curing compound. There shall be no caking or excessive settling of the pigment in the package that cannot be readily redispersed with a paddle.

The curing compound shall be packaged in clean 55-gallon steel barrels or round 5-gallon steel containers or shall be supplied from a suitable storage tank located at the jobsite. Each 55-gallon barrel shall be equipped with a built-in agitator having 2 sets of blades; one at the bottom, and the second, midway between top and bottom of container, and shall have removable lids and airtight band fasteners. On-site storage tanks shall be kept clean and free of all contaminants. Each tank shall have a permanent system designed to completely redisperse any settled material without introducing air or any other foreign substance. Barrels shall be filled in a manner that will prevent skinning. Five-gallon containers shall be well sealed with ring seals and lug type crimp lids. The lining of the containers shall be of a character that will resist the solvent of the curing compound and will not permit skins to be loosened into the body of the curing compound. Each container shall be labeled with the manufacturer's name, batch number, number of gallons and date of manufacture, and shall have an Interstate Commerce Commission Red Label warning concerning flammability. The label shall also warn that the curing compound shall be well stirred before use. When the curing compound is shipped in tanks or tank trucks, a shipping invoice shall accompany each load. The invoice shall contain the same information as that required herein for container labels.

Curing compound may be sampled by the Engineer at the source of supply and at the jobsite.

The curing compound shall not be applied until all patching and surface finishing, except grinding, has been completed. When deemed necessary by the Engineer during periods of hot weather, fogging of the concrete with water shall be continued after curing compound is applied until the Engineer determines that a cooling effect is no longer required. Such fogging after the application of the curing compound will be paid for as extra work as provided in subsection 104.03, "Extra Work".

501.03.10 Weather Limitations. Change the first paragraph of sub-paragraph "(b) Cold Weather - General" of this subsection to read as follows:

(b) Cold Weather - General. On all bridges and box culverts heating enclosures and heating devices shall conform to the requirements of sub-paragraphs (c) or (d) of this subsection of the Standard Specifications, as approved by the Engineer, to maintain the concrete surface temperature above forty (40) degrees Fahrenheit for seven (7) days. On all other structures, suitable enclosures and heating devices shall be provided to maintain the concrete surface temperatures above forty (40) degrees Fahrenheit for seven (7) days as approved by the Engineer.

SECTION 502 - CONCRETE STRUCTURES

502.02.01 General. Add the following to the list of materials in this subsection:

Elastomeric Bearing Pads----------Section 725

502.03.02 Forms. Add the following:

Plywood for left-in-place forms in box girders may be of any grade and thickness that will satisfy the other requirements of this subsection of the Standard Specifications.

502.03.03 Falsework. Add the following:

Falsework supporting the main carrying members of all continuous structures shall not be removed from any span until all spans between expansion joints are cured. Falsework and forms left in place in the cells of box girders shall not exceed 12 pounds per square foot of deck. All supports between the top and bottom slabs in the cells of box girders shall be water soaked for a period of not less than forty-eight (48) hours.

502.03.09 Pumping Concrete. Add the following:

The use of aluminum conduit for concrete pumping is prohibited.

502.03.10 Concrete Deposited Under Water. Add the following:

The use of an aluminum tremie for placing concrete is prohibited.

502.03.16 Finish of Horizontal Surfaces. Add the following:

FINISHING BRIDGE DECKS

A smooth riding surface of uniform texture, true to the required grade and cross section, shall be obtained on all bridge roadway decks. The Contractor may use hand tools, or finishing machines or a combination of both, conforming to the requirements specified herein for finishing bridge roadway deck concrete.

Finishing of concrete placed in bridge decks shall consist essentially of striking off the surface of the concrete as placed and floating with longitudinal floats the surface so struck off.

The placing of concrete in bridge roadway decks will not be permitted until the Engineer is satisfied that the rate of producing and placing concrete will be sufficient to complete the proposed placing and finishing operations within the scheduled time, that experienced finishing machine operators and concrete finishers are employed to finish the deck, that fogging equipment and all necessary finishing tools and equipment are on hand at the site of the work and in satisfactory condition for use. Finishing machines shall be set up sufficiently in advance of use to permit inspection by the Engineer during the daylight hours before each pour.

The adjustment and operation of deck finishing machines shall be verified by moving the machine over the full length of the deck section to be placed and traversing the float completely across all end bulkheads before placement of concrete is begun.

Unless adequate lighting facilities are provided by the Contractor, the placing of concrete in bridge decks shall cease at such time that finishing operations can be completed during daylight hours.

Rails for the support and operation of finishing machines and headers for hand-operated strike off devices shall be completely in place and firmly secured for the scheduled length for concrete placement before placing of concrete will be permitted. Rails for finishing machines shall extend beyond both ends of the scheduled length for concrete placement a sufficient distance that will permit the float of the finishing machine to fully clear the concrete to be placed. Rails or headers shall be adjustable for elevation and shall be set to elevations, with allowance for anticipated settlement, camber, and deflection of falsework, as required to obtain a bridge roadway deck true to the required grade and cross section. Rails or headers shall be of a type and shall be so installed that no springing or deflection will occur under the weight of the finishing equipment, and shall be so located that finishing equipment may operate without interruption over the entire bridge roadway deck being finished. Rails or headers shall be adjusted as necessary to correct for unanticipated settlement or deflection which may occur during finishing operations.

Should settlement or other unanticipated events occur, which in the opinion of the Engineer would prevent obtaining a bridge deck conforming to the requirements of these Specifications, placing of deck concrete shall be discontinued until corrective measures satisfactory to the Engineer are provided. In the event satisfactory measures are not provided prior to initial set of the concrete in the affected area, the placing of concrete shall be discontinued and a bulkhead installed at a location determined by the Engineer. All concrete in place beyond the bulkhead shall be removed.

Unless otherwise permitted by the Engineer, bridge deck concrete shall be placed in a uniform heading approximately parallel to the bridge pier or bent caps. The rate of placing concrete shall be limited to that which can be finished before the beginning of initial set, except that concrete for the deck surface shall not be placed more than 10 feet ahead of strike off.

After the concrete has been placed and consolidated, the surface of the concrete shall be carefully struck off by means of a hand-operated strike board operating on headers, or by a finishing machine operating on rails. A uniform deck surface true to the required grade and cross section shall be obtained.

Following strike off, the surface of the concrete shall be floated longitudinally. In the event strike off is performed by means of a hand-operated strike board, 2 separate hand-operated float boards for longitudinal floating shall be provided. The first float shall be placed in operation as soon as the condition of the concrete will permit and the second float shall be operated as far back of the first float as the workability of the concrete will permit.

In the event the strike off is performed with a finishing machine, longitudinal coating of the concrete shall be performed by means of a hand-operated float board or a finishing machine equipped with a longitudinal wooden float. The longitudinal wooden float on the finishing machine shall have a length of not less than 8 feet nor more than 12 feet. When both strike off and longitudinal floating are to be performed by finishing machines, one machine, with operator, shall be used for strike off and a second machine, with a second operator, shall be used for longitudinal floating. Longitudinal floating may be performed with the same finishing machine that is used for strike off provided that the length of deck unit being placed is not more than 30 feet and the strike off operation is completed for said deck unit before the condition of the concrete requires that longitudinal floating be started.

Finishing machines used for strike off having a wheel base 6 feet or less shall be followed by 2 separate hand-operated float boards for longitudinal floating. All the provisions in this section pertaining to hand-operated float boards shall apply to the 2 separate float boards for longitudinal floating.

Longitudinal floats, either hand-operated or machine-operated shall be used with the long axis of the float parallel to the centerline of the bridge roadway. The float shall be operated with a combined longitudinal and transverse motion planing off the high areas and floating the material removed into the low areas. Each pass of the float shall lap the previous pass by one-half the length of the float. Floating shall be continued until a smooth riding surface is obtained.

In advance of curing operations, the surface of the concrete shall be textured by brooming with a stiff bristled broom or by other suitable devices which will result in uniform scoring. Brooming shall be performed transversely from finishing bridges.

Hand-operated float boards shall be from 12 feet to 16 feet long, ribbed and trussed as necessary to provide a rigid float and shall be equipped with adjustable handles at each end. The float shall be wood, not less than one inch thick and from 4 inches to 8 inches wide. Adjusting screws spaced at not to exceed 24 inches on centers shall be provided between the float and the rib. The float board shall be maintained free of twist and true at all times.

Hand-operated float boards shall be operated from transverse finishing bridges. The finishing bridges shall span completely the roadway area being floated and a sufficient number of finishing bridges shall be provided to permit operation of the floats without undue delay. Not less than 2 transverse finishing bridges shall be provided when hand-operated float boards are used. When a finishing machine is used for longitudinal floating, one finishing bridge equivalent to the transverse finishing bridge specified herein shall be furnished for use by the Engineer.

All finishing bridges shall be of rigid construction and shall be free of wobble and springing when used by the operators of longitudinal floats and shall be easily moved.

Fogging equipment to be furnished shall be capable of applying water to the concrete in the form of a fine fog mist in sufficient quantity to curb the effects of rapid evaporation of mixing water from the concrete on the deck resulting from wind, high temperature or low humidity, or a combination of these factors. The fog mist shall be applied at the times and in the manner directed by the Engineer.

Immediately following completion of the deck finishing operations, the concrete in the deck shall be cured as specified in subsection 501.03.09 "Curing".

The finished surface of the concrete shall be tested by means of a straightedge 12 feet long. The surface shall not vary more than 0.01-foot from the lower edge of the straightedge. All high areas in the hardened surface in excess of 0.01-foot as indicated by testing shall be removed by abrasive means. After grinding by abrasive means has been performed, the surface of the concrete shall not be smooth or polished but shall have a surface texture satisfactory to the Engineer. Ground areas shall be of uniform texture and shall present neat and approximately rectangular patterns.

Where the concrete of the bridge deck is to be covered by bituminous surfacing, earth, or other cover, one inch or more in thickness, the surface of the concrete shall not vary more than 0.03-foot from the lower edge of the 12-foot straightedge.

Bridge deck surfaces under the curbs, railings, and sidewalks shall be struck off to the same plane as the roadway and left undisturbed when future widening is shown on the plans.

The top and face of the finished parapet and curb shall be true and straight, and the top surface shall be of uniform width, free from humps, sags, or other irregularities. When a straightedge twelve (12) feet long is laid on top of face of the curb or on the face of the parapet, the surface shall not vary more than one-eighth (1/8) inch from the theoretical grade or alignment in twelve (12) feet, except that proper allowance shall be made for curves and camber.

Manual methods, other than specified in this subsection, or machine methods for finishing bridge deck concrete may be permitted in accordance with the provisions in subsection 108.05 "Character of Workmen; Methods and Equipment", of the Standard Specifications.

502.03.18 Ordinary Surface Finish. Change this subsection to read as follows:

The surface shall have all holes left by form ties and all other holes one-fourth (1/4) inch or more in largest diameter repaired in accordance with subsection 502.03.15, "Patching." The surface shall be true and even, free from stone pockets, depressions or projections beyond the surface. All fins and projections shall be knocked off or ground flush. Offsets greater than one-eighth (1/8) inch shall be filled or tapered back to present a smooth appearance. A uniform color and appearance shall be obtained on all patched surfaces.

502.03.19 Fine Surface Finish. Change this subsection to read as follows:

Where it is indicated on the plans that a fine surface finish is required, the finish shall conform to the requirements for "Bonded Grout Finish" as hereinafter set forth. Before the finish is applied, the surface shall be true and even and free from stone pockets, depressions or projections beyond the surface. All fins and projections shall be knocked off or ground flush. Offsets greater than 1/8-inch shall be filled or tapered back to present a smooth appearance. All holes 1/4-inch or more in largest diameter shall be patched in accordance with subsection 502.03.15 "Patching".

Bonded Grout Finish. This finish shall be an application of grout consisting of sand and other pigments and mineral fillers combined with a suitable binder. The sand shall pass a No. 30 sieve. The binder shall be either an epoxy, acrylic, vinyl or phenolic resin. This mixture may be thinned by not more than twenty-five (25) percent water by volume.

The finish shall be of such consistency and composition that it will provide a uniform appearance in color and texture when applied as specified below, and shall meet the requirements set forth in Section 727 of these Supplemental Specifications.

At least thirty (30) days in advance of placing bonded grout finish, the Contractor shall furnish the Engineer a quart sample or larger, of the completed mixture for testing. The Contractor shall also furnish two certificates, issued by the manufacturer, certifying that the product complies with the specifications. Said certificates shall be delivered to the Engineer at least thirty (30) days in advance of placing the material.

The grout shall be applied by spray, using conventional spray equipment with a 1/4" round spray head. Material is supplied by either a surge pump with a 12 to 1 ratio or an auger type pump, with air pressure sufficient to achieve uniform texture. Worn spray heads shall be replaced as required to achieve a uniform finish.

Application shall be at the rate of 25-40 square feet per gallon.

The finished surface shall present a uniform appearance. The color and texture shall match that of the standard or special panel designated on the plans. In the event a standard or special panel is not designated on the plans, the color and textures shall match the standard or special panel designated by the Engineer. Standard panels A, B, C, D and E and any special panels which may be designated are available for inspection at the Department of Highways District Office and at the Headquarters office in Carson City..

If surface has been treated with curing compound or efflorescent salts are evident, these shall be thoroughly removed before finishing. This may be accomplished by:

1. Application of a 10% solution of muriatic acid or a 25% zinc sulfate solution, which shall be applied as to completely remove any oily film and to lightly etch the surface, or

2. Thorough cleaning by approved abrasive as required to remove all oily film.

Following cleaning, the surface shall be thoroughly rinsed with clean water. Surface not requiring the above treatment shall be hosed down with clean water prior to painting to remove loose dirt and dust. Surface to be finished need not be completely dry, but may be damp, prior to application of finish.

CAUTION: Do not apply finish unless temperature is at least 40 degrees F. and is rising. Application shall be stopped if temperature is 40 degrees F. and is dropping.

502.03.20 Live Loads. Change this subsection to read as follows:

Live loads such as traffic or superimposed earth loads shall not be allowed on the structure until concrete has reached an age of fourteen (14) days and it has reached the twenty-eight (28) day strength required. Live loads may be allowed on the structure when the concrete has reached an age of eight (8) days and the twenty-eight (28) day strength required in cases where Type III (high-early strength) cement is used with the approval of the Engineer.

The minimum days required before applying a live or superimposed load or removing forms shall be increased after the initial seven (7) days curing period in accordance with subsection 501.03.10(b), "Cold Weather-General".

In case the concrete does not reach the desired strength within the time specified, the Engineer shall determine when the strength is adequate to carry live loads.

502.04.01 Measurement. Change this subsection to read as follows:

The estimated quantity shown on the plans, plus or minus quantities covered by approved changes will be the quantity used for payment. The Engineer or the Contractor may however, request a final measurement. The Contractor's request for final measurement shall be in writing. Final measurement will be made according to the dimensions shown on the plans plus or minus approved changes and quantities derived therefrom will be the quantity used for payment. Each class of concrete will be considered separately.

Such box culverts, bridges, and such other miscellaneous concrete structures that are identified on the plans or in the Special Provisions as major structures will be paid for at the contract unit price bid for "Class ____ Concrete (Major)", or "Class ____ Concrete Modified (Major)" as the case may be.

Such pipe headwalls, endwalls, drop inlets, and such other miscellaneous concrete structures that are identified on the plans or in the Special Provisions as minor structures will be paid for at the contract unit price bid for "Class ____ Concrete (Minor)".

When class A, AA, D, DA, A or AA Modified Portland Cement Concrete is placed and is shown by test to be below the specified 28-day compressive strength, a determination shall be made by the engineer as to whether the concrete shall be removed and replaced or allowed to remain in place. If the concrete is allowed to remain in place, it is agreed by the parties to the contract that the Department will deduct, from money due, or to become due the Contractor from the Department, a percentage of the contract unit bid price. This deduction shall be considered to be liquidated damages and shall be as set forth in the following schedule.

Specified 28 Day Compressive Strength - PSI			Liquidated Damage (per Unit Bid Price)
3000	4000	5000	0%
2999 - 2950	3999 - 3930	4999 - 4915	2
2949 - 2900	3929 - 3860	4914 - 4830	4
2899 - 2850	3859 - 3790	4829 - 2745	9
2849 - 2800	3789 - 3720	4744 - 4660	18
2799 - 2750	3719 - 3650	4659 - 4575	27
2749 - 2700	3649 - 3580	4574 - 4490	40
2699 - 2650	3579 - 3510	4489 - 4405	55
2649 - 2600	3509 - 3440	4404 - 4320	70
2599 - or less	3439 - or less	4319 - or less	80

Concrete removed will not be paid for and the removal thereof will be at the Contractor's expense.

No measurements or other allowances will be made for work, material for forms, falsework, cofferdams, pumping, bracing, etc.

The quantity of concrete involved in fillets, scorings and chamfers two (2) square inches or less in cross sectional area shall be neglected. No deduction shall be made for the volume of concrete displaced by reinforcing steel, expansion joint material, drainage and weep holes. The volume of concrete displaced by pipes, conduits, ducts, and forms for voids embedded in concrete that are in excess of two (2) square

inches in cross sectional area shall be deducted. Deduction shall also be made for the volume of timber piles, concrete piles and cast-in-place piles embedded in the concrete.

Tremie seal concrete will be measured on the basis of batched volume placed.

The quantity of concrete hand rail to be measured for payment will be the number of linear feet complete and in place.

All measurements will be made in accordance with subsection 109.01, "Measurement of Quantities".

502.05.01 Payment. Change this subsection to read as follows:

The accepted quantity of concrete measured as provided in subsection 502.04.01, "Measurement", will be paid for at the contract unit price bid per cubic yard for the Class or Type specified. Reinforcing steel will be paid for as provided in Section 505, "Reinforcing Steel". All metal parts, fabrics, pads, joint filler, drains, and any other materials not specifically mentioned for payment herein, will be considered subsidiary to the other pay items of the work and no further compensation will be allowed therefor; except however, if changes to deck drains are ordered by the Engineer, which increases the materials beyond that required for the deck drains as shown on the plans, such additional material shall be measured and paid for as "Structural Steel", as set forth in subsection 506.05.01, or in the absence of structural steel such additional material shall be measured and paid for as "Reinforcing Steel" as set forth in subsection 505.05.01.

The accepted quantity of concrete rail measured as provided in subsection 502.04.01, "Measurement", will be paid for at the contract unit price bid per linear foot.

All payments will be made in accordance with subsection 109.02, "Scope of Payment".

Payment will be made under:

Pay Item	Pay Unit
Class ____ Concrete (Major)	Cubic Yard
Class ____ Concrete (Minor)	Cubic Yard
Concrete Rail	Linear Foot
Tremie Seal Concrete	Cubic Yard
Class ____ Concrete, Modified (Major)	Cubic Yard

SECTION 505 - REINFORCING STEEL

505.02.01 General. All bar steel reinforcement may be either Grade 40 or Grade 60 unless otherwise specified on the plans, and shall conform to requirements set forth in subsection 713.03.01 of these specifications.

Spiral Reinforcement may be either Bar Steel Reinforcement conforming to the requirements of subsection 713.03.01 of these specifications or Steel Wire, of the equivalent size of the bar steel, conforming to the requirements of subsection 713.03.05 of these specifications.

505.03.03 Bending. The "ACI Manual of Standard Practice", referred to in this subsection of the Standard Specifications means the ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures".

505.03.05 Splicing. Splices in spiral steel shall be made by welding or by a lap of one and one-half (1-1/2) turns.

505.04.01 Measurement. Change the reference made in this subsection from 109.61 to 109.01.

SECTION 506 - STEEL STRUCTURES

506.01.01 General. Add the following:

The Contractor may, at his option, furnish bridge rail and pedestrian rail constructed either of steel or aluminum conforming to the Standard Specifications, the Special Provisions and the plans. Rail shall conform to plan sheet entitled "Bridge Rail, Type __*__" or "Pedestrian Rail, Type __*__", as the case may be.

506.02.01 General. Add the following to the list of materials in this subsection:

Elastomeric Bearing Pads----------Section 725

Add the following:

Steel Bridge and Pedestrian railing shall be primed and painted in accordance with Section 714, subparagraph (a), of the Standard Specifications and these specifications.

Bridge or pedestrian rail and posts made of aluminum shall not be painted.

Shims shall be either aluminum alloy or asbestos sheet packing, at the Contractor's option. Aluminum Alloy Shims shall conform to ASTM Designation: B 209 Alloy 1100-0. Asbestos sheet packing shall be composed essentially of asbestos fibers bonded together with a cementing medium rendering it tough and pliable. The deformation of the packing under a load of 10,000 pounds per square inch shall be less than 16 percent of the thickness and the loss on ignition shall not be more than 25 percent.

Insulating material for insulating the bases of aluminum rail posts from concrete and from steel anchor bolts shall be an aluminum impregnated light colored caulking compound of the consistency of putty.

All bolts, nuts and washers used on aluminum railing shall be either steel galvanized in accordance with ASTM Designation: A 153 or be of stainless steel conforming to ASTM Designation: A 276.

506.03.10 Bolts and Bolted Connections. (c) High-Tensile-Strength Bolts. Change the third paragraph of subparagraph (c) of this subsection to read as follows:

Except as otherwise provided in this subsection of the Standard Specifications, construction shall conform to applicable specifications for rivited structures. In order to determine the required bolt length, the value shown on Table 1 of these Special Provisions shall be added to the grip (that is, the total thickness of all connected material, exclusive of washers).

Delete the fourth paragraph of subparagraph (c) of this subsection of the Standard Specifications.

Change Table 1 of this subsection on Page 389 of the Standard Specifications to read as follows:

Table 1 - Bolt Lengths

Bolt Size (inches)	Add to Grip (inches)
1/2	11/16
5/8	7/8
3/4	1
7/8	1-1/8
1	1-1/4
1-1/8	1-1/2
1-1/4	1-5/8
1-3/8	1-3/4
1-1/2	1-7/8

The preceding values are generalized, with due allowance for manufacturing tolerances, to provide for the use of a heavy hex nut, with a "full nut" when installed. For each hardened flat washer that is used, add 5/32 inch, and for each beveled washer add 5/16 inch. The length determined by the use of Table 1 should be adjusted to the next longer 1/4 inch.

506.03.20 Welding. Add the following:

Inspection shall be by the Engineer and/or by independent testing agencies selected by the Engineer and the expense will be borne by the department.

Radiographic and other non-destructive testing shall be required as set forth in this subsection and on other field welds which in the judgment of the Engineer are defective. No testing will be necessary on secondary members or steel piles, unless in the judgment of the Engineer the weld is defective, except that when H-piles are built up from plate the fillet welds shall be inspected by non-destructive testing.

The 1969 edition of the American Welding Society Standard Specifications for Welded Highway and Railway Bridges shall govern except as modified by the following revisions and additions:

When an ASTM A517 steel is to be welded, the requirements pertaining to ASTM A514 steel in the AWS Specification, as modified by this memorandum, shall be applicable.

Paragraph 102(f) - A new paragraph, 102(f), shall be added as follows: When an ASTM A514 quenched and tempered steel is to be welded, the welding procedure shall be submitted to the Engineer for approval and the procedure qualified by tests as prescribed in Appendix A, Part I, of these Specifications prior to the start of production welding. The Engineer, at his discretion, may accept evidence of previous qualification of the procedure to be used.

Paragraph 214(d) - The second sentence of Paragraph 214(d) shall be revised as follows: The unsupported projection of a flange shall not be more than 12 times the thickness of the plate except as specified by the AASHO specifications for compression members.

Paragraph 214(e)(1) - The first two sentences of Paragraph 214(e)(1) shall be replaced with the following: Cover plates shall be limited to one on any flange. The maximum thickness of a cover plate on a flange shall not be greater than 1-1/2 times the thickness of the flange to which the cover plate is attached.

Paragraph 221(a) - The first sentence of Paragraph 221(a) shall be revised as follows: When butt joints are used to join material of different thicknesses or widths, there shall be smooth transition between offset surfaces or edges at a slope of not more than 1 in 2-1/2 with the surface of either part except as otherwise permitted in Paragraph 221(b).

Paragraph 221(b) - The second sentence of Paragraph 221(b) shall be replaced with the following: When the offset is equal to or less than this amount, the face of the weld shall be sloped 1 in 2-1/2 from the surface of the thinner part or shall be sloped to the surface of the thicker part if this requires a lesser slope except that truss member joints and beam and girder flange joints shall be made with smooth transitions of the type specified in Paragraph 221(a).

Paragraph 225(a) - A new sentence shall be added at the end of Paragraph 225(a) as follows: Plug and slot welds shall not be used on A514 steel.

Paragraph 227(a) - The title to the Figure 227 referred to in Paragraph 227(a) shall be deleted. The chart on page 27 shall be titled as follows: Prequalified Manual Shielded Metal-Arc Welded Joints, Material of Limited Thickness (L).

Paragraph 302(a) - A new sentence shall be added at the end of Paragraph 302(a) as follows: Mill scale and extraneous material shall be removed from the torch side of A514 steel plates along the lines to be flame cut, when necessary to obviate excessive notches.

Paragraph 302(c) - The sixth sentence of subparagraph (1), Paragraph 302(c), shall be revised as follows: For steels other than A514, defects in oxygen cut edges shall not be repaired by welding except with the approval of the Engineer for occasional notches or gouges less than 7/16 inch deep for material up to 4 inches thick and less than 5/8 inch deep for material over 4 inches thick.

A new subparagraph (3) shall be added as follows: For A514 steel, defects in oxygen cut edges shall not be repaired by welding except with the approval of the Engineer for occasional gouges and notches as follows:

A. Notches or gouges not more than 3/16 inch deep in plate edges which will form the faces of a groove weld joint and which will subsequently be completely fused with the weld shall be repaired by welding. Non-metallic stringers or pipes opening to these edges shall be removed to a depth of 1/4 inch below the surface by grinding or chipping and the gouge repaired by welding. Laminations opening to these edges shall be removed to a depth of 1/2 inch below the surface by grinding or chipping and the gouge repaired by welding.

B. Notches or gouges not more than 3/16 inch deep in plate edges which will form a fillet-welded corner joint shall be repaired by welding only on the part of the edge which will become the faying surface for the joint and the fusion zone of the fillet weld. The part of the defect outside the toe of the completed fillet weld shall be removed by machining or grinding and faired to the oxygen cut surfaces with a slope not exceeding 1 in 10.

Such weld repairs shall be made by suitably preparing the defective area, welding with low-hydrogen electrodes of classification E 11018-M, AWS A5.5, not exceeding 5/32 inch in diameter, observing the applicable requirements of Art. 408 and 409 and grinding the completed weld smooth and flush with the adjacent surface to produce a workmanlike finish.

Paragraph 302(g) - A new paragraph, 302(g), shall be added as follows: Oxygen cut surfaces of members carrying calculated stress shall have the corners rounded to 1/16 inch radius by grinding after cutting.

Paragraph 303(g)(2) - The second sentence of Paragraph 303(g)(2) shall be revised as follows: Tack welds which are incorporated into final welds shall be made with electrodes meeting the mechanical requirements of the final welds and shall be cleaned thoroughly.

Paragraph 305(b) - A new paragraph, 305(b), shall be added as follows: Ends of members fabricated by welding which are to be field connected by welding shall be shop assembled or assembled to a template to insure conformance to Paragraph 303(a), (b) and (c).

Paragraph 307(b) - The first sentence of Paragraph 307(b) shall be revised as follows: Regardless of the method of inspection, welds shall have no cracks nor incomplete fusion and, except as amended by the standards of acceptance for ultrasonic testing, not less than the specified penetration and no other defects exceeding the following limits in size or frequency of occurence.

Paragraph 307(b)(1) - In Paragraph 307(b)(1), Note 2 shall be replaced with the following: Fusion-type defect signifies slag inclusions and similar elongated defects.

Paragraph 307(c) - A new paragraph, 307(c), shall be added as follows: Welds shown by visual inspection, or by nondestructive testing in accordance with Par. 607(a), to have defects prohibited by Par. 307(a) or Par. 307(b) shall be repaired or removed and replaced, by the methods permitted by Article 308, or the entire piece shall be rejected as determined by the Engineer. Repaired or replaced welds shall be re-inspected by the applicable nondestructive testing method.

Paragraph 401(a) - The present paragraph (a) shall be replaced with a new paragraph as follows: The electrode, electrode-flux combination or grade of weld metal for making groove welds and fillet welds on main members shall be in accordance with Table 3a.

The present Table 3 shall be replaced with new Table 3a.

Table 3a - Filler Metal Requirements for Welds on Main Members
(Groove Welds and Fillet Welds)

Base Metal (1) (ASTM Designation)	Welding Process (2) (3) (4)			
	Shielded Metal-Arc	Submerged Arc	Gas Metal-Arc	Flux Cored Arc
A36(5)	AWS A5.1 E7016, 18 or 28	AWS A5.17 F61, F62, F63 or F64-EXXXX	AWS A5.18 E70S-1B, 2, 3, 6 or E70U-1	AWS A5.20 E60T-8
A242, A441 A572 Gr. 42, 45, & 50 A588	AWS A5.1 E7016, 18 or 28	AWS A5.17 F71, F72, F73 or F74-EXXXX	AWS A5.18 E70S-1B, 2, 3, 6 or E70U-1	AWS A5.20 E70T-1, 5 or 6
A514	AWS A5.5 E11018-M	Grade F110	Grade E110S	Grade E110T

Use of same type filler metal having next higher mechanical properties as listed in the AWS Specification is permitted.

(1) In joints involving base metals of different yield points or strengths, filler metal applicable to the lower strength base metal may be used.

(2) When welds are to be stress relieved the deposited weld metal shall not exceed 0.05 percent vanadium.

(3) See Art. 422 for Electroslag and Electrogas weld metal requirements. Appendix E Impact Requirements are mandatory.

(4) Lower strength filler metal may be used for fillet welds and partial penetration groove welds when indicated on the plans or in the special provisions.

(5) AWS A5.1, E6010 or E6011 electrodes may be used for welding A36 steel not more than 1 inch thick.

Paragraph 401(c) - A new paragraph, 401(c), shall be added as follows: For exposed bare unpainted applications of ASTM A588 steel requiring deposited weld metal with atmospheric corrosion resistance and coloring

characteristics similar to that of the base metal, the filler metal for all welds shall be in accordance with Table 3b, except as otherwise permitted by Par. 401(d).

Table 3b - Filler Metal Requirements for Unpainted ASTM A588 Steel

Welding Process (4)			
Shielded Metal-Arc	Submerged Arc	Gas Metal-Arc	Flux Cored Arc
AWS A5.5 E8016 or 18-G(1,2) E8016 or 18-B1(2) E8016 or 18-B2(2) E8016 or 18-C1 E8016 or 18-C2 E8016 or 18-C3	AWS A5.17(3) F71, F72, F73 or F74-EXXXX or Grade F80(2,3)	AWS A5.18(3) E70S-1B, 2, 3, 6, or E70U-1 or Grade E80S(2,3)	AWS A5.20(3) E70T-1, 5, 6 or Grade E80T(2,3)

(1) Deposited weld metal shall have a chemical composition (percent) of 0.12 max. C, 0.50/1.10 Mn, 0.03 max. P, 0.04 max. S, 0.35/0.80 Si, 0.30/0.75 Cu, 0.40/0.80 Ni, and 0.45/0.70 Cr.

(2) Deposited weld metal shall have an impact strength, min., Charpy V-notch of 20 ft-lb at 0°F.

(3) Deposited weld metal shall have a chemical composition the same as that for any one of the weld metals obtained with the shielded metal-arc electrodes listed in this table.

(4) In multiple-pass welds, the underlying layers may be deposited with one of the filler metals specified in Table 3a provided the last two layers are deposited with one of the filler metals specified in this table. This procedure may also be used where the weld is made from one side on a backing strip which will be removed, provided the same number of layers are deposited against the backing strip with a filler metal specified in this table. After removing run-off tabs, the exposed weld metal of the underlying layers shall be removed by gouging to a minimum depth of 1/4 inch from the edge of the base material and replaced by welding with one of the filler metals specified in this table. The weld shall be ground flush with the edge of the material.

Paragraph 401(d) - A new paragraph, 401(d), shall be added as follows: For unpainted applications of A588 steel where welds with atmospheric corrosion resistance but not exact color match are acceptable to the Engineer, filler metals of Table 3a may be used as follows:

Shielded metal-arc process - For single pass fillet welds up to 1/4 inch maximum size.

Submerged arc process - For single pass fillet welds up to 5/16 inch maximum size and for groove welds made with one pass on each side.

Gas metal-arc or flux cored arc processes - For single pass fillet welds up to 5/16 inch maximum size and for groove welds made with one pass on each side.

Paragraph 401(e) - A new paragraph, 401(e), shall be added as follows: Where weldments are to be galvanized after welding, a type or brand of filler metal which will deposit weld metal with a low silicon content shall be used to avoid possible disintegration of the weld during the galvanizing process.

Paragraph 402 - Table 4 of Paragraph 402 shall be subject to the following modifications:

(a) For A36 steel to 3/4 inch thickness, inclusive, when welded with other than low-hydrogen electrodes, the minimum preheat and interpass temperature shall be 150°F.

(b) For all steels to 3/4 inch thickness, inclusive, when welded with low-hydrogen electrodes, or with submerged arc, gas metal-arc or flux cored arc welding, the minimum preheat and interpass temperature shall be 50°F.

Paragraph 408(a) - The present paragraph (a) shall be replaced with a new paragraph as follows: All electrodes for manual shielded metal-arc welding shall conform to the requirements of the latest edition of "Specification for Mild Steel Covered Arc Welding Electrodes," AWS A5.1, or the latest edition of "Specification for Low Alloy Steel Covered Arc Welding Electrodes," AWS A5.5, and when used for welding on main members, shall be capable of producing weld metal having an impact strength of at least 20 ft.-lbs., Charpy V-notch, at a temperature of 0°F. or below.

Paragraph 408(b) - Two new sentences shall be added at the end of Paragraph 408(b) as follows: Electrodes of any classification lower than E100XX, when used for welding A 514 steel, shall be dried at least one hour at temperatures between 700 and 800°F. before being used whether furnished in hermetically sealed containers or otherwise. Electrodes shall be redried no more than one time.

Paragraph 408(c) - The present paragraph (c) shall be replaced with a new paragraph as follows: The Contractor shall furnish certified copies of test reports, except as specified in Paragraph 408(d), of all pertinent required tests of AWS A5.1 or of AWS A5.5, whichever is applicable, made on electrodes of the same class, size, and brand and which were manufactured by the same process and with the same materials as the electrodes being used on the project. The tests may have been for process qualification or quality control and shall have been made within one year prior to manufacture of the electrodes furnished. For sizes of electrodes for which tests are not required by AWS A5.1 or AWS A5.5, the test reports for electrodes of the size nearest to the size being delivered and of the same classification shall be furnished. The report shall include the manufacturer's certification that the process and material requirements were the same for manufacturing the tested electrodes and the furnished electrodes. An appropriate form for reporting of electrode tests is shown in Enclosure A of this memorandum.

Paragraph 408(d) - A new paragraph, 408(d), shall be added as follows: In lieu of requiring a contractor to furnish copies of test reports for each shipment of electrodes on a project, the State may maintain a list of approved brands of electrodes for which satisfactory reports of tests made within one year have been previously submitted. The list shall be available to project engineers and contractors.

Paragraph 412(a) - The first sentence of Paragraph 412(a) shall be replaced with the following: All bare electrodes and fluxes used in combination for submerged-arc welding shall conform to the requirements in the latest edition, "Specifications for Bare Mild Steel Electrodes and Fluxes for Submerged Arc Welding," AWS A5.17, for the classifications producing weld metal having a minimum impact strength of 20 ft.-lbs., Charpy V-notch, at a temperature of 0°F. or below, and, when specified, shall be capable of producing low alloy weld metal having the mechanical properties listed below or low alloy weld metal conforming to the requirements of Paragraph 401(c).

Paragraph 412(c) - The present paragraph (c) shall be replaced with a new paragraph as follows: The Contractor shall furnish certified copies of test reports, except as specified in Paragraph 412(d), for all electrode and flux combinations used on a project in accordance with these Specifications. The reports shall include the results of all pertinent required tests of AWS A5.17 made on the same classification or grade of electrode and flux combination of the same brand as being used on the project. The tests shall have been made on electrodes and flux which were manufactured by the same process and with the same materials as the electrodes and flux furnished. The tests may have been for process qualification or quality control and shall have been made within one year prior to manufacture of the electrodes furnished. The test report form shall be similar to that shown in Enclosure A containing all pertinent information concerning the tests required by the specification.

Paragraph 412(d) - A new paragraph, 412(d), shall be added as follows: In lieu of requiring a contractor to furnish copies of test reports for each shipment of electrodes and flux on a project, the State may maintain a list of approved brands of electrode-flux combinations for which satisfactory reports of tests made within one year have been previously submitted. The list shall be available to project engineers and contractors.

Paragraph 413(a) - The first sentence of Paragraph 413(a) shall be revised as follows: Flux used for submerged arc welding shall be non-hygroscopic, dry and free of contamination from dirt, mill scale, or other foreign material.

Paragraph 416(a) - The second sentence of Paragraph 416(a) shall be revised as follows: For each joint to be used in construction, the joint details, electrode classification or grade, electrode diameter, voltage, amperage, travel speed, order and relative position of passes, number and thickness of layers, gas flow, dew point of gas, and other pertinent information shall be clearly presented in the Procedure Specification.

Paragraph 417(a) - The first sentence of Paragraph 417(a) shall be replaced with the following: All electrodes and combination of shielding for gas metal-arc welding shall conform to the requirements in the latest edition, "Specification for Mild Steel Electrodes for Gas Metal-Arc Welding," AWS A5.18, for the classifications producing weld metal having a minimum impact strength of 20 ft.-lbs., Charpy V-notch, at a temperature of 0°F. or below, and, when specified, shall be capable of producing low alloy weld metal having the mechanical properties listed below or low alloy weld metal conforming to the requirements of Paragraph 401(c).

Paragraph 417(b) - The present paragraph (b) shall be replaced with a new paragraph as follows: The Contractor shall furnish certified copies of test reports, except as specified in Paragraph 417(c), for all electrodes and combination of shielding gas used on a project in accordance with these Specifications. The reports shall include the results of all pertinent required tests of AWS A5.18 made on electrodes of the same classification or grade, of the same brand, welded with the same shielding gas and manufactured by the same process and with the same materials as the electrodes being used on the project. The tests may have been for process qualification or quality control and shall have been made within one year prior to manufacture of the electrodes furnished. The report shall include the manufacturer's certification that the process and material requirements were the same for manufacturing the tested electrodes and the furnished electrodes. The test report form shall be similar to that shown in Enclosure A containing all pertinent information concerning the tests required by the electrode specification.

Paragraph 417(c) - A new Paragraph, 417 (c), shall be added as follows: In lieu of requiring a contractor to furnish copies of test reports for each shipment of electrodes on a project, the State may maintain a list

of approved brands of electrodes for which satisfactory reports of tests made within one year have been previously submitted. The list shall be available to project engineers and contractors.

Paragraph 418(a) - The first sentence of Paragraph 418(a) shall be replaced with the following: All electrodes and combination of shielding for flux cored arc welding shall conform to the requirements in the latest edition, "Specification for Mild Steel Electrodes for Flux Cored Arc Welding," AWS A5.20, for the classifications producing weld metal having a minimum impact strength of 20 ft.-lbs., Charpy V-notch, at a temperature of 0°F. or below, and, when specified, shall be capable of producing low alloy weld metal having the mechanical properties listed below or low alloy weld metal conforming to the requirements of Paragraph 401(c).

Paragraph 418(b) - The present paragraph (b) shall be replaced with a new paragraph as follows: The Contractor shall furnish certified copies of test reports, except as specified in Paragraph 418(c), for all electrodes and combination of shielding used on a project in accordance with these Specifications. The reports shall include the results of all pertinent required tests of AWS A5.20 made on electrodes of the same classification or grade, of the same brand, welded with the same shielding gas and manufactured by the same process and with the same materials as the electrodes being used on the project. The tests may have been for process qualification or quality control and shall have been made within one year prior to manufacture of the electrodes furnished. The report shall include the manufacturer's certification that the process and material requirements were the same for manufacturing the tested electrodes and the furnished electrodes. The test report form shall be similar to that shown in Enclosure A containing all pertinent information concerning the tests required by the electrode specification.

Paragraph 418(c) - A new paragraph, 418(c), shall be added as follows: In lieu of requiring a contractor to furnish copies of test reports for each shipment of electrodes on a project, the State may maintain a list of approved brands of electrodes for which satisfactory reports of tests made within one year have been previously submitted. The list shall be available to project engineers and contractors.

Paragraph 419(a) - The second sentence of Paragraph 419(a) shall be replaced with the following: The Contractor shall furnish certification that the gas or gas mixture is suitable for the intended application and will meet the dew point requirement.

Paragraph 421(c) - The first sentence of Paragraph 421(c) shall be replaced by the following: The welding procedure qualification shall include impact tests.

Paragraph 422(a) - The first sentence of Paragraph 422(a) shall be revised as follows: Prior to use, the Contractor shall demonstrate by

the tests prescribed in Appendix A, Part 1, and in Appendix E that each combination of shielding and filler metal will produce welds having the following mechanical properties, supplemented by the impact strength requirement of Appendix E, when welded in accordance with the Procedure Specification.

A new sentence shall be added at the end of Paragraph 422(a) as follows: When such evidence is accepted, the Contractor shall furnish the manufacturer's certification that the filler metal and shielding being used on the project were manufactured with the same material and process requirements as the filler metal and shielding used for the previously qualified procedure.

The list of weld metal properties for joining ASTM A572 steel of grades 55, 60 and 65 shall be deleted.

Paragraph 424(a) - The second sentence of Paragraph 424(a) shall be replaced with the following: The Contractor shall furnish certification that the gas or gas mixture is suitable for the intended application and will meet the dew point requirements.

Paragraph 503(a) - The second sentence of Paragraph 503(a) shall be replaced with the following: If a fabricating shop prequalifies its welders, welding operators and tackers in accordance with these Specifications and certifies to the Engineer that the welder, welding operator or tacker has been prequalified within twelve months previous to the beginning of work on the subject structure, the Engineer may consider him qualified. The certificate shall state that the welder, welding operator or tacker has been doing satisfactory welding of the required type within the three month period previous to the subject work. A certification shall be submitted for each welder, welding operator or tacker, and for each project, stating the name of the welder, welding operator or tacker, the name and title of the person who conducted the examination, the kind of specimens, the position of welds, the results of the tests and the date of the examination. Such a certification of prequalification may also be accepted as proof that a welder, welding operator and tacker on field welding is qualified if the contractor who submits it is properly staffed and equipped to conduct such an examination or if the examining and testing is done by a recognized agency which is staffed and equipped for such purpose.

Paragraph 503(b) - A new paragraph, 503(b), shall be added as follows: Before welding on A514 steel, evidence must be presented, satisfactory to the Engineer, that each welder, welding operator and tacker has had at least three months satisfactory experience welding such steel. In lieu of such experience, each welder, welding operator and tacker shall be instructed in welding A514 steel. The instruction course shall meet the approval of the Engineer as adequate to result in a working knowledge of the procedures for welding A514 steel.

Paragraph 605(h) - A new paragraph, 605(h), shall be added as follows: When non-destructive testing is specified, the Inspector shall ascertain that equipment, procedures and techniques are in accordance with Article 607. The Inspector shall permit nondestructive testing to be performed only by personnel qualified in accordance with Par. 607(g). The Inspector shall view the making of nondestructive tests, examine and interpret the test results, approve satisfactory welds, disapprove or reject unsatisfactory welds, approve satisfactory methods proposed by the contractor for repairing disapproved welds, and inspect the preparation and rewelding of disapproved welds. The Inspector shall record the locations of inspected areas and the findings of all nondestructive tests, together with descriptions of any repairs made.

Paragraph 606(a) - The present paragraph (a) shall be replaced with a new paragraph as follows: It shall be the Contractor's responsibility to comply with all requests of the Inspector to correct improper workmanship and to remove and replace, or correct as instructed, all welds found defective or deficient by visual inspection or by nondestructive testing in accordance with Art. 607.

Paragraph 607(a) - The present paragraph (a) shall be replaced with a new paragraph as follows: Nondestructive testing of welds will be required as specified in Par. 607(h) and Par. 607(i). The welds to be tested, the extent of testing on each weld and the method of testing shall be specified in the information furnished to bidders. Methods of nondestructive testing other than those specified in the contract may be used for examination of weld passes or completed welds at the owner's expense.

Paragraph 607(b) - This paragraph shall be deleted. Refer to Par. 307(c).

Paragraph 607(d) - The present paragraph shall be replaced with a new paragraph as follows: When ultrasonic testing is used, the procedure, technique and standards of acceptance shall be in accordance with Bureau of Public Roads "Proposed Specification for the Ultrasonic Testing of Butt Welds in Highway and Railway Bridges," BPR-UTI, dated May 1, 1968.

Paragraph 607(g) - A new paragraph, 607(g), shall be added as follows: Personnel performing nondestructive testing shall be qualified in accordance with the American Society for Nondestructive Testing Recommended Practice No. SNT-TC-1A and the applicable Supplement A, B, C (as modified in Par. 607(d)), or D. Only individuals qualified for NDT LEVEL I, working under the supervision of an individual qualified for NDT LEVEL II, or individuals qualified for NDT LEVEL II or NDT LEVEL III may perform nondestructive testing.

Paragraph 607(h) - A new paragraph, 607(h), shall be added as follows: Unless otherwise specified, butt welds in main members shall be tested by the radiographic or ultrasonic method as follows:

(1) Shop welds

(A) All tension splices and all splices subject to reversals of stress, except that on beam and girder webs, only 1/6 of the web depth, beginning at the point, or points, of maximum tension and 25 percent of the remainder of the web depth need be tested.

(B) Twenty-five percent of each compression and shear splice, except that for splices in built-up members requiring less than four feet of groove weld in compression, only one joint, connecting the thickest components in each splice, need be tested. Maximum spacing of radiographs shall be four times the length of the radiograph. Alternatively, 25 percent of the compression and shear splices, selected by the Engineer, shall be tested. With radiographic testing, if unacceptable defects are found in more than 10 percent of the radiographs in compression and shear splices of a member, all compression and shear splices of that member and succeeding members shall be tested until the accumulated rejection level falls to 10 percent or less, at which time the testing shall revert to the 25 percent level specified above. With ultrasonic testing, if an unacceptable defect is found in a compression or shear splice in a flange or web, then all compression or shear splices in that flange or web shall be tested 100 percent.

(2) Field welds

(A) All tension splices, including splices subject to reversals of stress.

(B) All compression and shear splices in beams and girders, except that for rolled beam stringers of less than 27 inches nominal depth only the flange need be radiographed.

(C) For other members, 25 percent of each compression and shear splice except that for splices in built-up members requiring less than four feet of groove weld in compression, only one joint, connecting the thickest components in each splice, need be tested. Maximum spacing of radiographs shall be four times

the length of the radiograph. Alternatively, 25 percent of the compression and shear splices, selected by the Engineer, shall be tested. With radiographic testing, if unacceptable defects are found in more than 10 percent of the radiographs of the compression and shear splices, the remaining 75 percent of the splices shall be tested. With ultrasonic testing, if an unacceptable defect is found in a compression or shear splice, the splice welded next before and next after the defective splice shall be tested 100 percent.

(3) Should the radiographic or ultrasonic tests indicate rejectable defects, the areas on each side of the defect shall be tested to determine the full extent of the defective work.

Paragraph 607(i) - A new paragraph, 607(i), shall be added as follows: Unless otherwise specified, welds shall be tested by the magnetic particle method in accordance with the following:

(1) At least one foot of every 10-foot length of weld and one foot of each weld less than 10 feet in length of each size and type of fillet weld of girders, beams, stringers, truss members, bearing stiffeners, bearing shoes, and other main members, including the end connections for such members shall be tested.

(2) For A514 steel, all fillet welds and all other welds except the butt welds tested in accordance with Par. 607(h) shall be tested.

(3) The tests shall be located at random in the members so as to be typical for each size and type of weld.

(4) If unacceptable defects are found in any test length of weld, the full length of the weld, or five feet on either side of the test length, whichever is lesser, shall be tested.

(5) The requirements for magnetic particle testing shall apply equally to shop and field welds.

(6) The Inspector shall examine the magnetic particle tests and give his approval of the welds before the members will be accepted.

Paragraph 608(a) - A new paragraph, 608(a), shall be added as follows: Visual inspection and nondestructive testing of welds in all steels other than ASTM A514 may begin immediately after they are completed. Welds in A514 steel shall be visually inspected and nondestructively tested not less than 48 hours after they are completed.

Appendix A, Paragraph A101(a)(1) - Paragraph A101(a)(1) shall be revised as follows: Qualification of a welding procedure established with ASTM A441, A572 grade 50 or A588 steels shall be considered as procedure qualification for welding the other two steels, combinations of them or with steels included in Art. 102 having a lower minimum specified yield point and for the other steels included in Art. 102 having a lower minimum specified yield point.

Appendix A, Paragraph A101(c) - A new paragraph, A101(c), shall be added, as follows: For groove welds in ASTM A514 steel, the schedule of changes in variables shall be modified to require a new qualification:

(1) Whenever there is an increase in plate thickness or whenever there is a decrease in plate thickness of 1 inch or more.

(2) Whenever the number and location of passes is changed, except a proportional reduction in the number of passes is permissible without requalification whenever the thickness reduction is less than 1 inch and the heat input does not exceed the manufacturer's recommendation for the heat input of the thickness of material being welded.

(3) Whenever the heat input is changed by more than ±10 percent.

(4) Whenever the arc voltage is changed by more than ± 7 percent.

(5) Whenever the speed of travel is changed by more than ± 10 percent.

(6) Whenever the interpass temperature is changed by more than ± 25°F.

Appendix A, Paragraph A101(d) - A new paragraph, A101(d), shall be added, as follows: Reporting of the procedure qualification shall include specific values for all variables listed in Par. A101(b) and Par. A101(c).

Appendix A, Paragraph A105(a)(3) - A new paragraph, A105(a)(3), shall be added as follows: For groove welds in ASTM A514 steel, one test weld shall be made in material of the maximum thickness to be used in construction for each procedure and position.

Appendix A, Paragraph A105(b)(2) - A new paragraph, A105(b)(2), shall be added as follows: In addition, for fillet welds in ASTM A514 steel over 1 inch in thickness with weld metal having a minimum specified tensile strength of over 90,000 psi, a qualification test of "T"-joints shall be made in accordance with Figure I.

Appendix A, Paragraph A107(a) - The last sentence of Paragraph A107(a) shall be replaced with the following: In addition to these tests, the test plates shall be radiographically or ultrasonically tested for

soundness. Radiographic or ultrasonic testing shall apply only to that portion of the weld between the discard strips as indicated in the applicable figures of Appendix A except that a minimum of 6 inches of effective weld length shall be tested.

Appendix A, Paragraph A108(f) - The present paragraph (f) shall be replaced with a new paragraph as follows: The ultrasonic procedure and technique shall be in accordance with the requirements of Par. 607(d).

Appendix A, Paragraph A109(a)(5) - The present paragraph (5) shall be replaced with a new paragraph as follows: For acceptable qualification, the quality of the weld, as revealed by radiographic or ultrasonic testing, shall conform to the requirements of Art. 307 or Par. 607(d), whichever is applicable, except that for the procedure test for ASTM A514 steel, there shall be no defects other than allowable porosity in the test weld.

Appendix B, Paragraph B104(a) - This paragraph shall be deleted. Refer to Par. 307(c).

Appendix C, Paragraph C108(g) - This paragraph shall be deleted. Refer to Par. 307(c).

Enclosures

(Manufacturer's name

and address)

CERTIFICATE OF CONFORMANCE TO REQUIREMENTS FOR WELDING ELECTRODES
Supplied to:_____

Date_____ Quantity_____ Order No._____ Project No._____

This is to certify that (Trade name or No.) AWS classification (EXXXX), as supplied under the above order number, is of the same classification, manufacturing process, and material requirements, as the electrodes tested on _____, 19___.

All tests required by specification AWS A5.1 or AWS A5.5, were performed in conformance with this specification, and the above electrode met all the requirements. The electrodes are marked in conformance with AWS A5.1 or AWS A5.5.

The chemistry and mechanical properties of the deposited weld metal were as follows:

	5/32"		3/16"		1/4"	
	DC+	AC	DC+	AC	DC+	AC
Tensile Strength P.S.I.						
Yield Strength P.S.I.						
Elongation % in 2"						
Charpy V Notch Ft.Lbs. at ___°F.						
Manganese %						
Silicon %						
Nickel %						
Chromium %						
Molybdenum%						
Vanadium %						

Fillet Tests - Position as required _____

Radiographic test_____

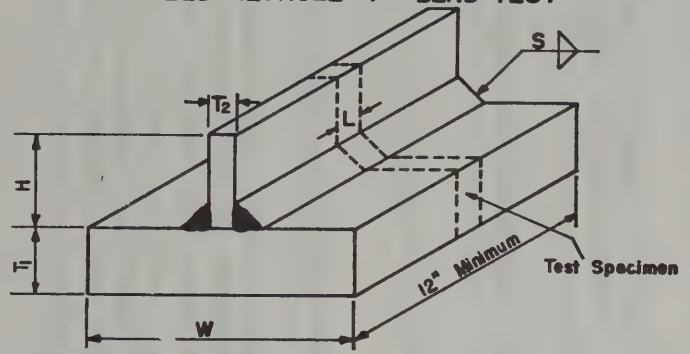
Fillet Test, Radiograph, chemistry and mechanical properties are not required for the following sizes:

_____ _____ _____

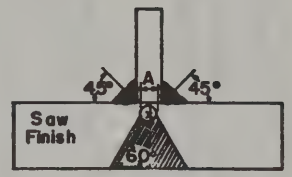
Operations Supervised by Chief Engineer Director

PROCEDURE QUALIFICATION
FILLET WELDED TEE JOINT TEST
FOR A 514/A517 STEEL IN FLANGES OVER 1" THICK AND WITH MINIMUM SPECIFIED TENSILE STRENGTH OF DEPOSITED WELD METAL OVER 90,000 psi.
MANUAL, AUTOMATIC AND SEMIAUTOMATIC

FILLET WELD KEYHOLE "T" BEND TEST

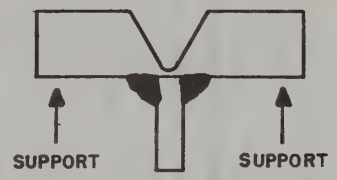


T_1 = Design Section—Flange — $H \geq 4T_2$ or 2"
T_2 = Design Section—Web — $W \geq 3T_1$ or 5"
S = Design Section—Fillet Weld — $L \geq 1\frac{1}{4}T_1$ or $1\frac{3}{4}$"

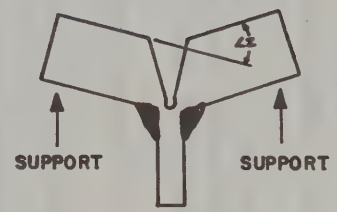


SPECIMEN

Drill Hole "A" To Equal $\frac{T_2}{2} + \frac{1}{16}$ inch
Cut out Cross Hatched Area



LOAD AT BEGINNING OF TEST



Load and bend to failure or until keyhole "V" notch is closed. Failure is indicated by opening in weld surface or crossection greater than 1/16" in any direction.

LOAD AT INTERMEDIATE STAGE OF TEST ILLUSTRATING MANNER OF BEND

NOTES

I. PREPARATION OF SPECIMENS
Test specimens may be sawed or machined (not flame cut) from a welded sample as illustrated above.
These specimens are prepared as shown above.

II. TESTING
A. Macro Etch Test (See Procedure Qualification AWS D2.0)
B. Bend Tests
Specimen shall be loaded and failed as illustrated above.
C. Hardness Tests
Hardness Tests shall be made on a lightly etched section of Macroetched test specimens with a suitable machine.

III. TEST RESULTS REQUIRED
A. Macro Etch Test - (See Procedure Qualification AWS D2.0)
B. Bend Tests
$\angle z$ must not be less than 18° at failure
C. Hardness
Brinell Hardness of weld metal shall be within the following limits
1. Max. Brinell Hardness
$$\frac{\text{Max. Specified or Tested Tensile Strength } {}^{(a)}\text{of Parent Metal}}{500} + 70$$
2. Min. Brinell Hardness
$$\frac{\text{Min. Specified Tensile Strength of Weld Metal}}{500}$$
This test may be performed with a Rockwell Machine and converted to Brinell Hardness using ASTM conversion chart.
(a) Whichever is greater.

FIGURE I

506.04.01 Measurement. Change the last paragraph of subparagraph (a) of this subsection to read as follows:

The quantity of structural steel measured for payment will be the number of pounds complete and in place except that additional weight of substitutions made at the Contractor's request will not be included.

Change subparagraph (b) of this subsection to read as follows:

(b) Deductions in weight will be made for copes, clips, sheared edges, punchings, borings, milling, and planing.

Add the following to subparagraph (c) of this subsection.

The weight of bolts, cap screws, anchor bolts, nuts, washers and anchor pipe sleeves remaining in the finished structure will be computed on the basis of their nominal weight and dimensions.

Change subparagraph (d) of this subsection to read as follows:

The weight of paint will not be included.

Change the first paragraph of subparagraph (e) of this subsection to read as follows:

The weight of weld metal will be computed on the basis of the theoretical volume of the dimensions of the welds with no allowance for overrun.

Change the term "standard bridge rail" as it appears in this subsection to read as follows: Bridge Rail, Type __*__. Pedestrian rail shall be measured by the linear foot of rail installed, complete in place.

506.05.01 Payment. Add the following to the first paragraph of this subsection:

The weight of additional steel in substitutions made at the Contractor's request will not be paid for.

Change the third paragraph of this subsection to read as follows:

Bridge rail or pedestrian rail shall be paid for at the contract unit price bid per linear foot for the type specified whether it be constructed of steel or aluminum, which payment shall be full compensation for furnishing, fabricating, delivering, erecting, painting and for all labor, materials, tools, supplies, equipment and incidentals necessary to complete the item, furnishing of mill test reports and test specimens, in accordance with the Standard Specifications, the plans and these Special Provisions.

Add the following to this subsection:

Full compensation for conforming to the welder qualification requirements of this section shall be considered as included in the contract price paid per pound for structural steel and no separate payment will be made therefor.

Change the pay item for bridge rail as it appears in this subsection to read as follows:

Pay Item	Pay Unit
Bridge Rail, Type *	Linear Foot
Pedestrian Rail, Type *	Linear Foot

*Type to be as shown on the estimate and proposal.

SECTION 508 - PILING

508.03.10 Cast-In-Place Concrete Piles. Add the following:

The length of steel shell to be ordered shall be determined by the Contractor. Should the Contractor elect to order piling in short lengths, all splices necessary to build up these shorter lengths to the length required, other than those splices specified for payment in subsection 508.04.01 of these specifications, shall be at the Contractor's expense.

508.03.11 Steel Piles. Add the following:

Piling built up from structural steel plates welded together may be substituted for the rolled steel piling shown on the plans provided that the depth, width, average mean thicknesses and moments of inertia of the built-up sections are at least equal to those of the rolled section and, the flanges are welded to the web with continuous fillet welds on each side of the web, and the welding conforms to Section 506.

508.05.01 Payment. Add the following:

Where piling built up from structural steel plates is substituted for the piling specified on the plans, the Contractor shall be entitled to no extra compensation for any excess thickness of steel furnished or for any extra work, materials, equipment, handling or treatment required to construct such piling.

The accepted quantity of "Furnish Cast in Drilled Hole Concrete Piles", measured as provided in Subsection 508.04.01 of the Standard Specifications, will be paid for at the contract unit price bid per linear foot, which price shall be full compensation for drilling holes for piling and disposing of material resulting therefrom, and for furnish-

ing and placing all materials including Portland cement concrete and reinforcing steel and for doing all the work necessary to install the piling complete and in place as shown on the plans and as directed by the Engineer.

SECTION 601 - PIPE CULVERTS - GENERAL

601.03.01 Earthwork. Change the second paragraph of this subsection to read as follows:

It is not required that Class C bedding for C.M.P. or C.M.A.P. be shaped to fit the pipe prior to installation.

601.04.01 Measurement. Change the second paragraph of this subsection to read as follows:

The quantity of culvert pipe to be measured for payment will be the actual number of linear feet of pipe including the stub on end sections, complete and in place. When pipes are cut to fit a structure or slope, the quantity to be paid for will be the length of pipe necessary to be placed before cutting, measured in even two (2) foot increments.

Attention is especially directed to plan sheets titled "STANDARD DETAILS - STRUCTURE EXCAVATION & BACKFILL - METHOD OF MEASUREMENT", which shall pertain.

SECTION 603 - REINFORCED CONCRETE PIPE

603.02.01 General. Add the following:

Oval shaped pipe, within the meaning of these specifications shall be pipe having major and minor internal axial dimensions as designated in the contract item. The length of the minor axis shall be between 60 percent and 65 percent of the length of the major axis. The first dimension designated will represent the axis that is to be placed horizontally and the second dimension will represent the vertical axis. The dimension, in feet, of the horizontal axis shall be the basis for calculating the strength of the pipe. The inside perimeter of oval pipes shall form either an ellipse, or an approximation thereof, as described by smooth, compounded circular arcs.

603.03.02 Earthwork. Add the following:

Oval reinforced concrete pipe shall be installed as prescribed for other reinforced concrete pipe.

SECTION 607 - UNDERDRAINS

607.03.01 Earthwork. Change subparagraph (a) of this subsection to read as follows:

(a) Trenches shall be excavated to the dimensions and grade required by the plans or as directed. A minimum three (3) inch bedding layer of drain backfill material shall be placed in the bottom of the trench for its full width and length.

SECTION 609 - CATCH BASINS, MANHOLES, AND INLETS

609.02.01 General. Add the following:

Crossbars for Type 7 and 8 drop inlets shall be unpainted 2-inch standard weight black pipe conforming to the requirements of ASTM Designation: A 53 or A 120. Straps shall be unpainted A 36 steel.

609.03.01 General. Add the following:

Commercially prefabricated frames and grates of equal or greater capacity and strength may be substituted for the design shown on the plans for drop inlets provided prior approval is obtained in writing from the Engineer.

Frames and grates shall be matchmarked in pairs before delivery to the work and grates shall fit into their frames without rocking.

609.04.01 Measurement. Add the following:

Crossbars and straps for Type 7 and 8 drop inlets shall be included in the measurement for payment by the contract bid price per pound for Structural Steel Grates.

SECTION 613 - CONCRETE CURBS, GUTTERS, AND SIDEWALKS

613.05.01 Payment. Change the fourth paragraph of this subsection to read as follows:

Reinforcing steel placed in curbs and gutters as shown on the plans or ordered by the Engineer will not be paid for directly but the cost thereof shall be considered as included in the contract bid prices for other items of work.

SECTION 614 - PAINTING

614.03.03 Surface Preparation of Steel. Add the following:

If the amount of steel to be painted exceeds 100 tons the surface shall be prepared by method (a), "Sand Blasting"; however, if the amount to be painted is 100 tons or less the surface may be prepared by method (d), "Hand Cleaning".

616.03.01 General. Add the following:

Post holes for metal posts that are drilled or dug shall be backfilled with Class A or AA concrete or grout.

Each strand of barbed wire shall be securely fastened to a braced post at each intermediate braced post assembly by wrapping twice around the post then securing to that part of the same wire stretched between posts. The remaining wire shall be cut off and the tie shall present a neat and workmanlike appearance.

Galvanized pipe brace rail shall not be spliced.

The first line of barbed wire above wire mesh shall be tied to the top wire of the wire mesh, midway between posts, with 12-gage galvanized steel wire or 9-gage aluminum hog rings.

Intermediate Braced Post Assemblies - Timber: The horizontal brace shall be placed six (6) inches below the tops of the brace posts and properly fitted and connected to them by two 3/8" by 4" steel dowels. The dowel pins shall extend two (2) inches into each brace and brace post. Two strands of 8-gage galvanized wire shall be run as a brace diagonally from four (4) inches above ground line on each brace post to four (4) inches below the top of the other brace post. An extra loop shall be made around each post at the point of attachment and the wire firmly stapled to the post. These brace wires shall then be twisted until the assembly is rigid.

Corner post assemblies shall be constructed as indicated on the standard fence details and the end post assemblies shall be composed of end posts and brace posts installed and braced as indicated for timber corner braces.

At the option of the Contractor, timber line posts may be installed by tamping firmly in place in drilled or dug holes or by driving, provided the method of driving does not damage the posts or cause the posts to be deflected from line and plumb. All other timber posts shall be installed in drilled or dug holes and tamped firmly in place. Round timber posts installed in drilled or dug holes shall have the butt end placed downward. Timber line posts which are to be driven, shall be machine pointed at the plant before being treated. The small end of driven round timber posts shall be pointed.

Each strand of barbed wire shall be securely fastened to a corner post, end post, or intermediate braced post assembly by wrapping twice around the post and securing to that part of the same wire stretched between the posts. The remaining wire shall be cut off and the tie shall present a neat and workmanlike appearance.

Staples shall be set so as to hold the wire securely, but should not be buried in the post in such a manner as to severely nick or bend the wire.

616.03.03 Chain-Link Fence. Change the last sentence of the third paragraph of this subsection to read as follows:

The top tension cable shall be at least three-eighths (3/8) inch diameter galvanized seven strand cable conforming to the requirements of the current ASTM Designation: A 475, common grade.

616.04.01 Measurement. Change the last sentence of the third paragraph of this subsection to read as follows:

Missouri gates, regardless of width, shall be measured for payment as units.

SECTION 618 - GUARDRAIL

618.01.01 General. Add the following:

This work shall also consist of furnishing and installing cable end anchor assemblies, guardrail expansion joints, and additional guardrail beam elements required for constructing double beam rail at locations shown on the plans.

618.02.01 General. Add the following:

Guardrail posts and blocks shall be rough construction grade and shall comply with the grading requirements of subsection 718.03.02 of these Supplemental Specifications.

Cable end anchor assemblies for metal beam guard railing shall be constructed as shown on the plans and shall conform to the requirements set forth in subsection 720.03.04 of these Supplemental Specifications.

618.02.02 Reflectors. Add the following:

Reflector plates shall be constructed and erected on guardrail in accordance with the details shown on the plans and in the Standard Specifications and shall be spaced as follows:

(a) 50 feet on tangents and curves of 700 feet radius or greater.

(b) On curves with less than 700 feet radius, markers shall be placed on the post nearest the spacing shown for guide posts in Table 1, as shown in the plans.

(c) At interchanges, guardrail markers with amber reflectors shall be installed at a maximum spacing of 50 feet along acceleration and deceleration lanes, and in accordance with paragraph (b) on turning ramps and roadways.

Reflectors shall be white except as noted in (c) above.

Reflector plates shall be fabricated from eleven (11) gage material.

618.03.01 General. Add the following:

Guardrail beam elements may be furnished in 12-foot 6-inch or 25-foot lengths at the option of the Contractor.

Cable end anchor assemblies for metal beam guard railing shall be constructed as shown on the plans and as specified herein.

In lieu of built-up fabrication of anchor plates as shown on the plans, anchor plates may be press-formed from steel plate, with or without welded seams.

Five cable clips and a cable thimble shall be used to attach cable to the anchor rod.

After installation and before backfilling, the portion of the anchor rod to be buried in earth shall be coated with a minimum 20-mil thickness of coal tar enamel conforming to AWWA Standard: C 203.

Metal components of the anchor assembly shall be fabricated in conformance with good shop practice and, except for the 8WF17, shall be hot-dip galvanized in accordance with the provisions in Section 715.

Anchor blocks shall be constructed of Class A or AA concrete conforming to the provisions in Sections 501 and 502 of the Standard Specifications and these specifications.

Concrete shall be placed against undisturbed material of the excavated holes for anchor blocks. The top 12 inches of holes shall be formed, if required by the Engineer.

Surplus excavated material remaining after the guard railing has been constructed shall be disposed of in a manner satisfactory to the Engineer.

The overall length of each anchor cable assembly shall be a minimum of 10 feet.

Change subsection 618.03.02 Galvanized Guardrail to read 618.03.03 Galvanized Guardrail.

Change subsection 618.03.03 Reconstructed Guardrail to read 618.03.04 Reconstructed Guardrail.

618.04.01 Measurement. Add the following:

The quantity of cable end anchors constructed will be measured for payment as units.

The quantity of new guardrail measured for payment will be the number of linear feet measured along the front face of the rail between centers of end posts or between center of end post and bridge connection, as the case may be. The length of expansion joints will not be deducted.

The quantity of guardrail expansion joints constructed will be measured for payment as units.

The additional guardrail beam elements required to construct the double beam rail at locations shown on the plans shall be measured for payment by the linear foot measured along the face of the additional rail between centers of end posts.

618.05.01 Payment. Add the following:

The accepted quantity of "Cable End Anchors" measured as provided above will be paid for at the contract unit price bid per each, which price shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in constructing cable end anchors, complete in place, including drilling anchor plate bolt holes in rail elements, excavating anchor block holes, backfilling and disposing of surplus material, as shown on the plans, as specified in these specifications and as directed by the Engineer.

The accepted quantity of "Guardrail Expansion Joints" measured as provided above will be paid for at the contract unit price bid per each, which price shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in constructing the expansion joints complete in place.

The accepted quantity of "___*___ Guard Rail Beam Elements" measured as provided above will be paid for at the contract unit price bid per linear foot of double beam rail, which price shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in constructing the double beam rail complete in place.

Payment will be made under:

Pay Item	Pay Unit
Cable End Anchors	Each
Guardrail Expansion Joints	Each
* Guard Rail Beam Elements	Linear Foot

*Type to be as shown on the estimate and proposal.

SECTION 619 - CULVERT MARKERS AND GUIDE POSTS

619.01.01 General. Add the following:

Hazard Markers shall also be included in this section.

619.03.01 General. Add the following:

Hazard markers shall be assembled, fastened, set and aligned in accordance with the details and dimensions shown on the plans. Reflectors shall be installed when required as indicated. The exact locations will be determined by the Engineer.

619.05.01 Payment. Change the last paragraph to read as follows:

Payment will be made under:

Pay Item	Pay Unit
Guide Posts	Each
Reset Guide Posts	Each
Hazard Markers	Each
Reset Hazard Markers	Each

SECTION 625 - CONSTRUCTION SIGNS

625.01.01 General. Add the following:

This work shall also consist of furnishing and erecting traffic delineator cones or posts for rental at locations set forth on the plans or as directed by the Engineer, for the protection of the work, workmen and guidance and safety of the traveling public.

625.02.01 General. Add the following:

Traffic delineator cones shall be manufactured of a good commercial quality flexible material with a weighted base. The overall height of the cone shall be at least 28 inches and shall be yellow, orange or red-orange in color.

Traffic delineator cones for use at night shall have at least one 3-inch prismatic yellow reflector securely attached thereto facing oncoming traffic.

Traffic delineator posts shall be manufactured of a good commercial quality tubular material with a weighted base. The overall height of the posts shall be at least 36 inches and be constructed of a plastic tube of not less than 9 inch circumference and shall be yellow, orange or red-orange in color. Traffic delineator posts for use at night shall have at least two 3-inch prismatic yellow reflectors securely attached thereto facing oncoming traffic.

Black posts with yellow reflectorized spiral wrapping will also be acceptable.

625.03.01 General. Add the following:

Traffic delineator cones or posts shall be used for traffic delineation and lane closures as directed by the Engineer.

The use of sand bags or rocks on the cones or posts will not be permitted.

Traffic delineators shall be of the same type, color and appearance within each area being delineated.

The sixteenth paragraph of this subsection of the Standard Specifications is hereby changed to read as follows:

Highways closed to traffic shall be protected by Class 1 or 1A barricades on which shall be placed appropriate warning signs. The Contractor shall provide and maintain appropriate warning and detour signs at all closures, intersections, and along detour routes, directing the traffic around the closed portions of the highway so that the temporary detour route or routes shall be indicated clearly throughout its or their entire length. All barricades, signs, and obstructions shall be illuminated at night, and all lights for this purpose shall be kept burning from sunset to sunrise. All lighting shall conform to the M.U.T.C.D. Manual.

Flasher lights shall be yellow and shall meet the following minimum requirements:

1. Candle power--in excess of 40 candle power.
2. Head--one way visibility with 220 degree vision.
3. Lens--non-reflectorized lens. Lens shall be clean while in use.

Construction signs mounted on larger than four inch by four inch timber supports shall be drilled at locations six inches and eighteen inches above the ground line. The drill holes shall be two inches in diameter and shall be parallel to the axis of the sign support and parallel to the sign face.

625.04.01 Measurement. Change the second paragraph of this subsection to read as follows:

Barricades will be measured for rental and will be identified by the class set forth in the proposal. If more than one class of barricade is involved, separate measurement will be made for each class given. For purposes of measurement and rental, Class 1 barricades shall be measured for rental by the linear foot of width of the barricade or barricades erected; Class 1A barricades shall be measured for rental by the linear foot of width of barricade or barricades erected and shall include illumination and power or a generator for power to accomplish such illumination as shown on the plans and as directed by the Engineer. Class 2 barricades shall be measured for rental as units. Traffic delineator cones or posts shall be measured for rental as units of Traffic Delineators.

625.05.01 Payment. Change the second paragraph of this subsection to read as follows:

The accepted quantity of barricades measured as provided above will be paid for at the contract unit price bid per linear foot for Class 1 and Class 1A barricades and at the contract unit price bid per each for the Class 2 barricades and traffic delineators.

Payment for rental of construction signs and barricades shall hereby be changed to read as follows:

Pay Item	Pay Unit
Rent Construction Signs	Square Foot
Rent Construction Barricades (Class 1)	Linear Foot
Rent Construction Barricades (Class 1A)	Linear Foot
Rent Construction Barricades (Class 2)	Each
Rent Traffic Delineators	Each

SECTION 626 - TEMPORARY SIGNS

626.04.01 Measurement. Change the second paragraph of this subsection to read as follows:

Barricades will be measured for payment and will be identified by the class set forth in the proposal. If more than one class of barricade is involved, separate measurement will be made for each class given. Class 1 barricades shall be measured for payment by the linear foot

of width of the barricade or barricades erected complete in place to the satisfaction of the Engineer. Class 1A barricades shall be measured for payment by the linear foot of width of barricade or barricades erected complete in place to the satisfaction of the Engineer and shall include facilities for illumination and power to accomplish such illumination as shown on the plans and as set forth in the Special Provisions.

Temporary signs and barricades shall remain a part of the completed project.

626.05.01 Payment. Change the second paragraph of this subsection to read as follows:

The accepted quantity of barricades measured as provided above will be paid for at the contract unit price bid per linear foot for Class 1 and Class 1A barricades.

Change the payment for temporary signs and barricades to read as follows:

Pay Item	Pay Unit
Temporary Signs	Square Foot
Temporary Barricades (Class 1)	Linear Foot
Temporary Barricades (Class 1A)	Linear Foot
Temporary Signs, Remove and Reset	Square Foot
Temporary Signs, Remove	Square Foot
Temporary Signs, Reset	Square Foot

SECTION 627 - PERMANENT SIGNS

627.01.01 General. Add the following:

The work shall generally consist of:

(a) Overhead signs, including concrete foundations, steel sign posts and frames, reflectorized aluminum sign panels, sign lighting and appurtenances;

(b) Ground mounted signs consisting of concrete foundations, steel or aluminum sign posts, reflectorized aluminum sign panels, and appurtenances.

627.02.01 General. Add the following:

All wood material in timber sign supports shall be kiln dried before treatment to a maximum moisture content of 25 percent measured at the mid-point of the post at a depth of one inch. Timber shall be incised prior to treatment. After treatment the material shall again be kiln dried to a maximum moisture content of 25 percent measured at the mid-point at a depth of one inch.

Wood material in timber sign supports shall not be painted but all such material shall be pressure treated with preservative in accordance with Section 719 of the Standard Specifications except as modified in these Special Provisions. The preservative used shall be one of the following and shall conform to the specifications as listed:

Preservative	Specification
Acid copper chromate	AASHO Designation: M 133
Ammonical copper arsenite	AASHO Designation: M 133
Chromated copper arsenate	AASHO Designation: M 133
Chromated zinc arsenate	AASHO Designation: M 133
Chromated zinc chloride	AASHO Designation: M 133
Copperized chromated zinc chloride	AASHO Designation: M 133
Fluor chrome arsenate phenol mixture	AASHO Designation: M 133

Where it is impractical to obtain the specified retention because of the character of the wood in the charge, the treatment shall be to refusal. The retentions may be determined either by gage or scale reading or by assay.

627.03.01 Fabrication. (c) Add the following:

Supporting Frame (overhead) shall be manufactured in accordance with the plans and in accordance with the requirements herein specified. All metal parts shall be galvanized after fabrication, in accordance with the provisions of Section 715. When permission is granted by the Engineer to zinc coat a surface by means other than hot-dip galvanizing, the metalizing process shall be used to place the zinc. Metalizing shall be performed in accordance with the AWS Specifications and the thickness of the sprayed zinc coat shall be at least 5 mils.

Truss frames shall be fabricated to the largest practical sections prior to galvanizing. Splice locations shall be submitted to the Engineer for approval and the Contractor shall not commence fabrication until such splice locations are approved.

Welding. All welding in the fabrication of the structure shall be done by welders qualified in accordance with AWS requirements using the inert-gas shielded-arc method. All welds shall be free of cracks, blow holes and other irregularities and shall be wire brushed or otherwise cleaned and all the work shall be done in a neat and workmanlike manner.

No field welding on any part of the structural assembly will be permitted.

Foundations. Reinforced concrete foundations and the anchorage when sign structures are attached to another structure shall conform to the details shown on the plans. Foundation anchor bolt assemblies and structure anchorages shall be considered as part of the sign structures.

After placing, the exposed surfaces of the foundations, including the pedestal portion, shall be cured as provided in Subsection 501.03.09, "Curing".

Structure excavation and structure backfill, concrete and reinforcement shall conform to the provisions in Section 206, "Structure Excavation"; 207, "Backfill"; 502, "Concrete Structures"; 505, "Reinforcing Steel"; and 508, "Piling" respectively.

(e) Shop Drawings. Change this paragraph to read as follows:

Before fabrication is started, not less than four sets of shop drawings shall be prepared and submitted to the Engineer for approval. One set shall be returned to the fabricator. The shop drawings shall clearly indicate the quantity of each type of sign to be supplied, the color combination, and all dimensions. Each overhead sign structure shall have five sets of shop drawings submitted for approval, prior to fabrication.

Add the following paragraph:

(f) Sign Panels (overhead). Sign panel sections shall be fabricated of standard width sheets not less than four (4) feet wide, except that not more than two (2) sheets for any one sign may be cut to less than four (4) feet in width in order to fabricate signs which are not multiples of four (4) feet in total width. Panel sections shall run from the top edge to the bottom edge of the sign without horizontal joints. Reflectorized overhead aluminum sign panels shall conform to the requirements of reflectorized aluminum ground mounted signs unless otherwise specified.

627.03.03 Sign Background. Change the second sentence of this subsection as follows:

The color provided for sign background material and letters shall conform and match by visual comparison as nearly as possible the colors described in the M.U.T.C.D. manual, and the "Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways".

Change the specifications for reflectorized background of signs of this subsection as follows:

The reflective sheeting shall consist of spherical lens elements embedded within a transparent plastic having a smooth, flat outer surface, except, for silver white letters, numerals, symbols and direct applied borders. The sheeting shall be weather resistant and have a protected pre-coated adhesive backing.

A. Photometric Requirements.

1. Background - The reflective sheeting shall have the following minimum brightness values at .2° and .5° and 1.5° divergence expressed as average candlepower per foot-candle per square foot of material. Measurements shall be conducted in accordance with standard testing procedures for reflex reflectors of Federal Specification L-S-300, "Sheeting and Tape, Reflective; Nonexposed Lens Adhesive Backing".

	Silver White # 1			Silver White # 2			Yellow		
Div. Ang.	.2	.5	1.5	.2	.5	1.5	.2	.5	1.5
Inc. Ang.									
-4°	60	25	4	72	33	4	25	10	2.5
40°	12.5	7.5	1.6	14	10	1.6	4	1.8	0.7

	Red			Blue			Green		
Div. Ang.	.2	.5	1.5	.2	.5	1.5	.2	.5	1.5
Inc. Ang.									
-4°	12.5	6.5	1.0	4	2	0.6	9	3.5	1.0
40°	1.9	1.2	0.4	0.9	0.4	0.08	1.8	1.0	0.2

2. Applied or Demountable Copy - Reflective sheeting for all sign copy including letters, numerals, symbols and borders shall be silver-white, encapsulated lens, wide angle reflective sheeting. Route markers shall be silver-white #2.

3. Rainfall Performance - The brightness of the reflective sheeting, totally wet by rain, shall not be less than 90% of the above values. Wet performance measurements shall be conducted in conformance with Standard RAINFALL TEST specified in Federal Specification L-S-300, "Sheeting and Tape, Reflective, Nonexposed Lens Adhesive Backing".

B. Color Requirements.

The colors of reflective sheeting used on the signs shall conform and match by visual comparison as nearly as possible the colors specified in the current "AASHO Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways". They shall meet the specifications of the color tolerance charts approved by the Bureau of Public Roads, June 1965.

C. Adhesive Requirements.

1. The reflective sheeting shall include a pre-coated pressure sensitive adhesive (Type I) or a tack-free heat activated adhesive (Type II), either of which may be applied without necessity of additional adhesive coats on the reflective sheeting or application surface.

2. The protective liner attached to the adhesive shall be removed by peeling without soaking in water or other solvents and shall be easily removed after accelerated storage for four hours at 150 degrees F. under weight of 2.5 pounds per square inch.

3. The adhesive shall form a durable bond to smooth, corrosion and weather-resistant surfaces and permit the reflective sheeting to adhere securely, 48 hours after application, at temperatures of -30 degrees to 200 degrees F. The adhesive bond shall be sufficient to render the applied sheeting vandal-resistant and prevent its shocking off when jabbed with a spatula at -10 degrees F. The sheeting shall resist peeling from the application surface when a 5 lb./in. width force is applied as outlined in ASTM-D-903.

D. Film Requirements.

1. General - The reflective sheeting shall be sufficiently flexible to be easily cut to shape and permit application over and conformance to moderate, shallow embossing characteristic of certain sign borders and symbols. Conditioned for 48 hours, the tensile strength of the sheeting shall be 5 to 20 lbs./in. width when tested in accordance with ASTM-D-828 with 10 to 45% elongation (ASTM-D-987). Following liner removal, the reflective sheeting shall not shrink more than 1/32" in 10 minutes nor more than 1/8" in 24 hours in any dimension per 9" square at 75 degrees F. and 50% RH.

   The sheeting when applied according to manufacturer's recommendations to cleaned and etched .020" x 2" x 8" aluminum, conditioned (24 hours) and tested at 72 degrees F. and 50% RH shall be sufficiently flexible to show no cracking when bent around a 3/4" mandrel.

2. Surface - The sheeting surface shall be smooth and flat, facilitate cleaning and wet performance, and exhibit 85 degrees glossmeter rating of not less than 40 (ASTM-D-523). The sheeting surface shall be readily processed and compatible with recommended transparent and opaque process colors and show no loss of color coat with normal handling, cutting, and application.

The sheeting shall permit cutting and color processing at temperatures of 60-100 degrees F. and relative humidities of 20-80%. The sheeting shall be heat resistant and permit force curing without staining of unapplied sheeting at temperatures up to 150 degrees F. and up to 200 degrees F. on applied sheeting. The sheeting surface shall be solvent resistant such that it may be cleaned with gasoline, VM&P Naptha, mineral spirits, turpentine, methanol and xylol.

3. Lens Elements - The reflective sheeting shall possess stable and durable spherical lens elements which, following extraction, shall show no deterioration following submersion in a 5N solution of sulphuric acid (H_2SO_4) for 30 minutes at 72 degrees F.

E. Durability

1. Processed, applied and cleaned in accordance with recommended procedures, the reflective sheetings used on traffic control signs shall be considered as performing satisfactorily, for the number of years stated by the bidder, which have not deteriorated due to natural causes to the extent that the resulting defects when viewed from a vehicle make the sign ineffective for the intended purpose or the average nighttime reflective brightness is less than that specified in Table I below. The bidder shall furnish certifications from the manufacturer that the materials conform to Table I.

TABLE I

Sheeting Type & Color	Average minimum candlepower per foot candle per square foot at 0.2 degree divergence and -4 degrees incidence	Satisfactory Performance Life
Silver-white #1	30	7 years
Silver-white #2	36	7 years
Yellow	12	7 years
Red	5	7 years
Blue	2	7 years
Green	3	7 years

Silver white demountable letters, numerals, symbols and direct applied borders shall conform to the following requirements for Encapsulated Lens, Wide Angle Reflective Sheeting.

A. Description - The silver letters, numerals, symbols and borders shall be of adhesive coated reflective sheeting, permanently adhered to a flat aluminum backing or to sign face sheeting. The reflective sheeting shall consist of spherical lens elements adhered to a synthetic re-

sin and encapsulated by a flexible transparent plastic having a smooth outer surface and shall conform to the specifications for "Encapsulated Lens Wide Angle Reflective Sheeting".

B. Fabrication - The reflective sheeting shall be applied to the properly prepared aluminum or sign face sheeting with the equipment and in a manner prescribed by the sheeting manufacturer.

C. Specification, Encapsulated Lens Wide Angle Reflective Sheeting

1. Requirements

a. Photometric

The reflective sheeting shall have the following minimum brightness values at .2°, .5° and 1.5° divergence expressed as average candlepower per foot-candle per square foot of material. Measurements shall be conducted in accordance with standard photometric testing procedures for reflex-reflectors, paragraph 4.5.2.9 of Federal Specification L-S-300, "Sheeting and Tape, Reflective; Non-exposed Lens Adhesive Backing".

		Silver		
Divergence Angle		.2°	.5°	1.5°
Incidence Angle	-4°	180	65	8
	40°	25	15	2

Wet performance measurements on unweathered sheeting shall be conducted in accordance with standard rainfall test specified in Federal Specification L-S-300 and the brightness of the reflective sheeting totally wet by rain, shall not be less than 90% of the above values.

OR

Samples shall be submerged in a tank of clean water (approximately 72°F) for a period of 5 minutes. Reflex-reflective performance of the sheeting shall be viewed in a darkened room by reflected light through the surface of the water or through a transparent plane surface of the tank parallel to the sample surface. Light source shall be such as a hand flashlight held close to the eye. The wet sheeting shall show no apparent loss or reflective performance as compared to dry material.

b. Adhesive

(1) The reflective sheeting shall include a precoated pressure sensitive adhesive and shall be applied in a manner specified by the sheeting manufacturer to recommended, properly prepared flat surfaces without necessity of additional adhesive coats on the reflective sheeting or application surface.

(2) The protective liner attached to the adhesive shall be removed by peeling without soaking in water or other solvents and shall be easily removed after accelerated storage for 4 hours at 150° F under weight of 2.5 pounds per square inch.

(3) The adhesive shall form a durable bond to smooth corrosion and weather resistant surfaces and permit the reflective sheeting to adhere securely 48 hours after application at temperatures of -10°F to 150°F. The adhesive coated sheeting shall be vandal resistant and when jabbed with a spatula at -10°F the adhesive bond shall prevent the reflective sheeting from shocking off. The sheeting shall resist peeling from the application surface when a 5 lb./in. width force is applied as outlined in ASTM-D-903-49.

c. General

(1) The reflective sheeting shall be sufficiently flexible to be easily cut to shape. Following liner removal, the reflective sheeting shall not shrink more than 1/64" in 24 hours in any dimension per 9" square at 75°F and 50% RH.

The sheeting when applied according to manufacturer's recommendations to cleaned and etched .020" x 2" x 8" aluminum, conditioned (24 hours) and tested at 72°F and 50% RH shall be sufficiently flexible to show no cracking when bent around a 3/4" mandrel.

(2) The sheeting surface shall be smooth and facilitate cleaning and wet performance, and exhibit 85° gloss meter rating of not

less than 50 (ASTM-D-523-62T). The sheeting surface shall be readily processed and compatible with recommended transparent and opaque process colors and show no loss of the color coat with normal handling, cutting and application. Following accelerated outdoor exposure as outlined in paragraph D of this specification, no process colors shall be removed when tested by scratching through the color surface, applying cellophane tape over the scratched area, and removing the tape with one quick motion.

The sheeting shall permit cutting and color processing at temperatures of 60° - 100°F and relative humidities of 20-80%. The sheeting surface shall be solvent resistant such that it may be cleaned with gasoline, VM&P Naphtha, mineral spirits, turpentine, and xylol.

(3) The reflective sheeting shall be easily cleaned and shall show no appreciable loss of reflective intensity or change in appearance when compared with new material. A sample shall be applied in accordance with the manufacturer's recommendations to a 6" x 12" x .040" aluminum panel. The sample shall be thoroughly hand cleaned with non-abrasive detergent, rinsed and wiped dry. The sample shall then be sprayed with water suspended soils collected from the underside of local vehicles and allowed to dry thoroughly.

The water suspension of soils shall be prepared by scraping dirt, etc., from the underside of vehicle fenders, mixing with water in the proportion of five pounds of soil to one gallon of water, and pouring the mixture through a paint strainer to remove large particles. Mixture shall then be vigorously stirred and then immediately sprayed onto panel while particles are in suspension. After the panel is thoroughly dry, it shall be washed with a clean mixture of water and a mild detergent. Panel shall be cleaned, clear water rinsed, and wiped dry for examination.

d. Durability

(1) Mounted on flat degreased and etched aluminum panels, the reflective sheeting shall be weather resistant and following cleaning shall show no appreciable discoloration, cracking, blistering, chalking, or dimensional change and not less than 80% of the specified minimum brightness values wet or dry when exposed to outdoor accelerated weathering for two years south facing, unprotected at 45° in south Florida.

(2) The reflective sheeting exposed at a commercial test facility for 24 months in Florida at 45° south facing, shall not support fungus growth and accumulate dirt to the extent that the reflective brightness before cleaning is less than 75% of the reflective brightness after cleaning, when measured at 0.2 divergence and -4° incidence. The supplier shall furnish written evidence or samples showing conformance to this requirement.

627.03.04 Cut-out Letters, Numerals, Symbols, and Accessories. Add the following:

(a) Borders shall be applied directly to sign face. Aluminum backing will not be required.

627.04.01 Measurement. Add the following:

Permanent signs, other than signs listed as "Overhead", shall be measured for payment by the square foot for signs with metal support and for signs with timber supports. The square footage shall be determined from the dimensions of the sign panels in the completed and accepted work.

Sign panels on permanent signs listed as overhead signs shall be measured by the square foot of sign panel in the completed and accepted work.

Sign supports for permanent signs listed as overhead signs shall be measured and paid for on the Lump Sum basis.

627.05.01 Payment. Add the following:

These items, measured as provided above, shall be paid for at the contract unit price bid per square foot for "Permanent Signs (Metal Support)" or "Permanent Signs (Timber Support)", which shall be full compensation for furnishing all labor, materials, tools, supplies, equip-

ment and incidentals and for doing all the work involved in furnishing and erecting permanent signs (other than signs listed as overhead) complete in place as shown on the plans and as herein specified, including but not limited to structure excavation and backfill, concrete foundations, supports, sign islands, and making all required tests.

Sign panels shall be paid for at the contract unit price bid per square foot for "Permanent Sign Panels (Overhead)" which payment shall be full compensation for furnishing all labor, materials, tools, supplies, equipment and incidentals and for doing all the work involved in furnishing and erecting permanent sign panels (for signs listed as overhead signs) complete in place as shown on the plans and herein specified.

Sign supports shall be paid for at the contract Lump Sum price bid for "Permanent Overhead Sign Support Structures" which payment shall be full compensation for furnishing all labor, materials, tools, supplies, equipment and incidentals and for doing all the work involved in furnishing and erecting permanent sign supports (for all signs listed as overhead signs) complete in place as shown on the plans and as herein specified, including structure excavation and backfill, concrete foundations, cast-in-place concrete piles, structural steel posts and frame, sign islands, sign lighting consisting of electrical fixtures, ballast, conduit, switches, loadside wiring from switch, and electrical appurtenances, and making all required tests.

Add the following section:

SECTION 628 - MOBILIZATION

628.01 General. The item of mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site, for the establishment of all offices, buildings and other facilities necessary for work on the project, as well as all other work and operations which must be performed, or costs incurred, not otherwise paid for prior to beginning work on the various items on the project site.

This item shall also consist of furnishing water and electricity to all department furnished field laboratories used on the project. The amount of water and electricity supplied shall be that necessary to satisfy the requirements of the Department and the Contractor shall make all necessary connections of both water and electricity to the laboratories.

628.02 Payment. Payment for this work will be made at the contract Lump Sum bid price for "Mobilization". Partial payments for the item "Mobilization" will be made as set forth under Section 109 of these Special Provisions.

Add the following section:

SECTION 632 - HEADLIGHT GLARE SCREEN

DESCRIPTION

632.01.01 General. This work shall consist of furnishing and installing headlight glare screen at the locations and in accordance with the details shown on the plans and as specified herein.

Headlight glare screen may consist of expanded steel or aluminum mesh panels mounted on galvanized steel posts and tied to a top and bottom tension wire or may be of other acceptable material specified in the plans and the Special Provisions.

MATERIALS

632.02.01 General. The aluminum and steel materials for the headlight glare screen shall conform to the following provisions:

(a) Expanded Mesh. The expanded steel mesh panels shall be fabricated from 22 gauge Galvanized Sheet Commercial Quality (Dry for continuous strip painting) to A.S.T.M. A-525. 1.25 oz commercial galvanized coating with minimum spangle - or

The expanded aluminum mesh panels shall be fabricated of aluminum alloy 3105-H25. The expanded mesh panels shall have the following nominal dimensions:

Diamond Size - 1.33" short dimension
(center to center of bridges)

- 4.00" long dimension
(center to center of bridges)

Strand Size - Aluminum 0.050" Steel 0.034" thick.
- Aluminum or Steel 0.250" in width.

Panel Size - 2'0" long dimension of diamonds
6'8" or 12'8" short dimension of diamonds

The weight of expanded aluminum mesh shall be not less than 0.21-pound per square foot.

Steel mesh panels before fabrication shall be treated in power washing equipment with a chemical conversion coating conforming with the requirements of Federal Specification MIL-C-5541 and furnished with two (2) coats of protective paint on both sides, applied before fabrication.

Aluminum mesh panels before fabrication shall be treated in power washing equipment with a chemical conversion coating conforming with the

requirements of Federal Specification MIL-C-5541 and finished with one coat of high temperature baking enamel on both sides, applied before fabrication.

The finish for the steel mesh panels shall be one primer coat of zinc chromate containing epoxy followed by a finish coat of commercial quality, high temperature baking enamel, made with a combination of alkyd, vinyl, and amino resins, or equivalent materials formulated for roller coating application. Both coats shall be applied in one continuous pass through the roller coating equipment.

The finish for the aluminum mesh panels shall be commercial quality, high temperature baking enamel, made with a combination of alkyd, vinyl, and amino resins, or equivalent materials, formulated for roller coating application.

The color of the enamel finish shall be Interstate Green unless otherwise specified. The baked enamel finish shall be uniform throughout and shall be smooth and free from flow lines, streaks, blisters, or other surface imperfections.

The composition of the baked dry film shall conform to the following requirements:

1. Thickness. The dry film thickness shall be not less than 0.8 mil as determined by ASTM Designation: D 1400.

2. Gloss. The gloss of the enamel shall be standard medium gloss (60 degrees specular gloss 70 minimum when tested in accordance with Federal Test Method Standard No. 141, Method 6101).

3. Color Uniformity. The color uniformity of the enamel after baking shall be constant within commercial limits when checked visually in the Macbeth Daylight Booth.

4. Coating Adhesion. There shall be no loss of adhesion of the coating to the base metal during or after fabrication of the expanded mesh panels.

After fabrication, expanded mesh when installed on the barrier rail shall give a complete cut-off of all oncoming headlight beams at angles up to 20 degrees from their straight ahead direction.

Shearing shall be accomplished in a uniform and workmanlike manner with a minimum of burrs, edge spalling of enamel, sharp edges and shear marks.

(b) Posts, Caps and Hardware. Posts on metal beam barrier rail shall be fabricated of structural steel conforming to the specifications of ASTM Designation: A 36 and shall be hot-dip galvanized after fabrication in accordance with specifications of ASTM Designation: A 123. Hardware shall be commercial quality and shall be galvanized.

Posts on concrete barrier rail shall be standard weight black pipe conforming to the requirements of ASTM Designation: A 53 or A 120 and shall be threaded to receive standard threaded pipe caps. Posts and caps shall be hot-dip galvanized after fabrication. Hardware shall be commercial quality and shall be galvanized.

(c) Tension Wires. The top and bottom tension wires shall be 7-gage and shall be galvanized coil spring steel wire of commercial quality.

(d) Wire Ties. The bottom tension wire shall be tied to each post with 9-gage (0.1483" min. dia.) steel wire ties or hog rings. The expanded mesh panels shall be tied to the top and bottom tension wires and to each post with 11-gage (0.120" min. dia.) steel wire ties or hog rings. Wire ties shall be given at least one complete turn.

Steel wire ties and hog rings shall be commercial quality and shall be galvanized.

Aluminum wire ties or hog rings of the same minimum diameters as specified for steel may be substituted for steel wire ties or hog rings.

The aluminum wire ties shall be aluminum alloy 1100-H18 conforming to the specifications of ASTM Designation: B 211. Aluminum hog rings shall be fabricated from either aluminum alloy 6061-T94 or 5052-H38.

(e) Removable Expanded Mesh Panel. Removable expanded mesh panels shall be installed as shown on the plans.

The steel "L"-shaped bolts with nuts and washers for supporting the removable panel and the sign fastening hardware shall be commercial quality and shall be galvanized.

The sign shall conform to the provisions for target plates as provided in Section 619 of the Standard Specifications, the plans and the Special Provisions. The enamel finish coat shall comply with the requirements of Federal Specification TT-E-489 as required in Section 721 of the Standard Specifications. The color of the finished sign shall be white. The letters on the sign shall be black.

Note: Without expense to the Department two certificates covering each order of material shall be furnished by the manufacturer, certifying that the product complies with the specifications. One certificate shall be delivered to the Engineer in charge at the job site at the time of, or prior to, delivery of the order. The other certificate shall be delivered to the Department at Carson City prior to acceptance of the material.

CONSTRUCTION

632.03.01 General. Headlight glare screen shall be erected on steel posts and tied to a top and bottom tension wire and shall be mounted on the metal beam

or concrete barrier rail at the locations and in accordance with the details shown on the plans. The exact location of the removable expanded mesh Emergency Panel will be determined by the Engineer.

METHOD OF MEASUREMENT

632.04.01 Measurement. The quantity of headlight glare screen to be paid for will be determined by the linear foot from actual measurement along the line of the completed headlight glare screen.

BASIS OF PAYMENT

632.05.01 Payment. The quantity of headlight glare screen measured as provided above, shall be paid for at the contract unit price bid per linear foot for "Headlight Glare Screen" which payment shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing headlight glare screen, including the Emergency Panels and hardward complete in place as shown on the plans and as specified.

Add the following section:

SECTION 634 - ASBESTOS-CEMENT PIPE

DESCRIPTION

634.01.01 General. This work shall consist of furnishing and installing asbestos-cement pipe for culverts, sewers, storm drains, and conduits as shown on the plans or directed by the Engineer in accordance with the provisions specified in these Specifications and the Special Provisions.

Asbestos-cement pipe shall be of the class shown on the plans, as specified in these specifications Provisions and as designated in the contract item.

MATERIALS

634.02.01 General. Asbestos-cement pipe culvert shall conform to the specifications of ASTM Designation: C 428, Type II, and these specifications.

The classes of pipe specified in Section 2a and the minimum crushing strength prescribed in Table II of Section 7 in said C 428 are superseded by the following:

1. Asbestos-cement pipe shall be designated as Class II or Class III based on the crushing strength per foot of pipe as listed in the following table:

Pipe Class	Crushing Strength Per foot, in pounds
II	1500D
III	2000D

(Where D is the diameter of pipe, in feet.)

2. Crushing strength tests shall be performed in accordance with the requirements of AASHO Designation: T 33.

The tests for soundness and flexural strength specified in Sections 5 and 6 of ASTM Designation: C 428, will not be required.

Each pipe length shall be provided with a sleeve coupling designed to maintain alignment and insure tight flexible joints. At the option of the Contractor the material for the couplings shall be either of the same composition as the pipe or of a plastic material not susceptible to attack by normal atmospheric or soil conditions. Couplings shall be sampled for compliance testing at the same rate of frequency as required for the pipe.

Couplings of the same composition as the pipe shall meet the same crushing strength requirements as required for the pipe. These couplings shall contain rubber gaskets or sealing rings. These rubber rings shall conform to the requirements of ASTM Designation D 1869.

If plastic couplings are used, the crushing strength test shall be performed on an end one foot length of pipe, tapered to receive the coupling. This end one foot section shall meet the minimum crushing strength requirement for the class of pipe specified. The crushing strength test shall be performed in accordance with the requirements of AASHO Designation: T 33 except that plaster of paris bedding fillets may be used.

The material for the plastic coupling shall be a polyethylene material complying with the requirements of ASTM Designation: D 1248, Type I, Class C, Grade 5, except that samples taken from the finished coupling shall have a minimum tensile strength of 1500 psi and a minimum elongation of 400 percent. The Contractor shall furnish to the Engineer a certification by the manufacturer that the material in the plastic couplings to be furnished conforms to the requirements of the aforesaid specification. The certification shall be supported by a certified copy of the results of tests, performed by the manufacturer upon samples of the material to be used in the couplings. The finished plastic couplings shall conform to the following table of minimum dimensions:

Inside Pipe Diameter	Thickness	Length
12" through 16"	0.15"	6-3/4"
18" through 21"	0.18"	8-1/2"
24" through 27"	0.21"	10-1/4"
30" through 36"	0.25"	12-1/4"

(Length is measured along the longitudinal axis)

CONSTRUCTION

634.03.01 General. Construction methods shall conform to the applicable requirements of Section 601 - "Pipe Culverts - General" and in addition thereto shall meet the following requirements.

634.03.02 Structures. Where shown on the plans, inlet and outlet structures shall be constructed or installed in connection with asbestos-cement pipes. Where such structures are constructed or installed the ends of pipes shall be placed flush or cut off flush with the structure face, unless otherwise directed by the Engineer.

634.03.03 Laying Culvert Pipe. Asbestos-cement pipe used for drainage purposes and dry conduits shall be laid and jointed in accordance with generally accepted practice and the following provisions in order to obtain results for the purpose intended.

Necessary facilities shall be provided for lowering and properly placing the sections of pipe in the trench.

The pipe shall be laid to the lines and grades with the sections closely jointed. All pipe shall be laid upgrade, unless otherwise permitted by the Engineer.

Every precaution shall be taken to prevent flooding the pipe trench before backfilling operations. Free water shall not be allowed to come in contact with the pipe line until portland cement sealing materials have set at least 24 hours.

METHOD OF MEASUREMENT

634.04.01 Measurement. Method of measurement shall conform to the requirements of subsection 601.04.01, "Measurement".

Asbestos-cement pipe will be measured by the linear foot of pipe for the different sizes and classes listed in the contract items.

All measurement will be made in accordance with subsection 109.01, "Measurement of Quantities".

BASIS OF PAYMENT

634.05.01 Payment. Payment shall conform to the requirements of subsection 601.05.01, "Payment", and in addition thereto, the following requirements shall apply.

The accepted quantities of asbestos-cement pipe measured as specified in subsection 634.04.01, "Measurement", will be paid for at the contract unit price bid per linear foot for asbestos-cement pipe of the size and class specified. These payments shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing different sizes and classes of pipe, complete in place as shown on the plans, as specified in these specifications and as directed by the Engineer.

Structure excavation and structure backfill will be paid for as set forth in Section 206 and Section 207.

Add the following section:

SECTION 646 - WATERPROOFING AND DAMPPROOFING

DESCRIPTION

646.01.01 General. This work shall consist of furnishing and applying membrane waterproofing or dampproofing to the surface of the concrete as shown on the plans and as specified in these specifications. Membrane waterproofing consists of a coating of primer and a firmly bonded membrane composed of 2 layers of saturated glass fabric and 3 moppings of waterproofing asphalt. Dampproofing consists of a coating of primer and 2 moppings of waterproofing asphalt.

MATERIALS

646.02.01 General. Waterproofing asphalt shall conform to the specifications of ASTM Designation: D 449, Type A for below ground and Type B for above ground, except that the ductility for Type B shall be 5 minimum. The provisions in said D 449 relating to felt, asbestos felt, and cotton fabrics shall not apply.

Primer for use with asphalt in waterproofing below and above ground level shall conform to the specifications of ASTM Designation: D 41.

Fabric shall conform to the specifications of ASTM Designation: D 1668 for bituminous glass fabric treated with asphalt.

CONSTRUCTION

646.03.01 General. All concrete surfaces which are to be waterproofed shall be reasonably smooth and free from holes and projections which might puncture the membrane. The surface to be waterproofed or dampproofed shall be dry and shall be thoroughly cleaned of dust and loose materials.

No primer or asphalt shall be applied in wet weather, nor when the temperature is below 65° F., without authorization in writing from the Engineer.

The primer shall be applied to the surface and allowed to dry before the first coat of asphalt is applied.

The waterproofing asphalt shall be applied at a temperature of not less than 300° F., nor more than 350° F.

646.03.02 Membrane Waterproofing. Membrane waterproofing shall not be applied to any surface until the Contractor is prepared to follow its application with the placing of the backfill within a sufficiently short time that the waterproofing will not be damaged as a result of exposure to weathering. Any waterproofing membrane which loses its bond with the concrete shall be removed and replaced with new membrane waterproofing by the Contractor at his expense.

Beginning at the low point of the surface to be waterproofed, the waterproofing asphalt shall be thoroughly mopped onto the surface. A strip of fabric of half the width of the roll shall be rolled onto the hot asphalt immediately and carefully pressed into place so as to eliminate all air bubbles and obtain close conformity with the surface. This strip and an adjacent section of the surface of a width equal to slightly more than one-half the width of the fabric being used, shall then be mopped with hot asphalt and a full width of the fabric shall be rolled into this, completely covering the first strip, and shall be pressed into place as before. This second strip and an adjacent section of the concrete surface shall then be mopped with hot asphlat and the third strip of fabric shingled on so as to lap the first strip by not less than 2 inches. This process shall be continued until the entire surface is covered, each strip of fabric lapping at least 2 inches over the last strip but one. The entire surface shall then be mopped with hot asphalt. Special care shall be taken at all laps to see that they are thoroughly sealed down.

The work shall be so regulated that at the close of the day's work the final mopping of asphalt shall have been applied to all the fabric in place.

646.03.03 Dampproofing. The waterproofing asphalt shall be thoroughly mopped onto the surface to be dampproofed. When the first mopping of asphalt has set sufficiently, the entire surface shall then be mopped with the second coating of hot asphalt. Special care shall be taken to see that there are no skips in the coatings and that all surfaces are thoroughly covered.

METHOD OF MEASUREMENT

646.04.01 Measurement. The quantities of membrane waterproofing or dampproofing placed as shown on the plans or directed by the Engineer will be determined by the square yard from measurement of the area covered by the membrane waterproofing or dampproofing.

BASIS OF PAYMENT

646.05.01 Payment. The quantity of membrane waterproofing or dampproofing measured as provided above, shall be paid for at the contract unit price bid per square yard for "Membrane Waterproofing" or "Dampproofing", which payment shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in applying the waterproofing membrane or dampproofing, complete in place, as shown on the plans and as specified.

Add the following section:

SECTION 660 - PNEUMATICALLY PLACED CONCRETE MORTAR

DESCRIPTION

660.01.01 General. This work consists of air-placement* of a mixture of sand and cement with water, in the construction of slope paving, to the areas and thickness shown on the plans.

*If the Contractor so elects, he may place the slope paving by methods other than air-placement providing such methods are approved by the Engineer

MATERIAL

660.02.01 General. The materials used shall be those prescribed for the several items which constitute the finished work and shall conform with all the requirements for such materials as set forth in this specification and in DIVISION III, "Material Details".

Cement shall be Type II "low-alkali" cement. Sand shall conform to the requirements of subsection 706.03.03, "Fine Aggregate".

The dry mixture shall consist of one (1) part Portland cement to four (4) parts sand, thoroughly mixed in a dry state. Measurement may be either by volume or weight. Before placing the proportioned materials in the hopper of the application gun, all lumps three-eighths (3/8) inch or over shall be removed by screening.

Mesh reinforcing for ditch lining and slope paving reinforcement shall be of the sizes shown on the plans, fabricated of cold drawn steel wire and need not be galvanized. Mesh reinforcing shall conform to the requirements of Section 505 of the Standard Specifications.

Header boards consisting of 2" x 4" redwood lumber furnished and placed in the concrete slope paving shall be as shown on the plans. Lumber used in the construction of header boards shall be commercial grade heart redwood, S4S.

Nails used in construction of header boards shall be commercial quality galvanized nails.

All concrete mortar for slope paving shall have an integral color pigment added. The color pigment shall consist of a synthetic mineral oxide specifically manufactured for coloring concrete. The integral concrete coloring shall be obtained by mixing the pigment material with the Portland cement, aggregates and water in a sequence and by methods that will result in a uniform mixture.

The color of the finished slope paving surfaces shall conform to Federal Standard Color No. 30324 as shown in Table II of Federal Standard No. 595. The color shall conform to the referee color except that minor deviations in color and tint representative of the method of mixing and applying the slope paving, will be acceptable.

The Engineer shall be the sole judge of compliance of the test panel construction with the texture and color requirements of these specifications and for conformance to the required color.

CONSTRUCTION

660.03.01 Preparation of Foundation. The subgrade for paved ditches and slope paving shall be formed by excavating to the required depth below the prepared finish surface grade in accordance with dimensions and design indicated on the plans or as directed by the Engineer.

The subgrade shall be thoroughly compacted. Any soft, spongy or other unsuitable material shall be removed to such depth as directed and backfilled with suitable material and thoroughly compacted to a relative density of at least 95% as determined by Test Method Nev. T101 or T102. Water shall be sprinkled on the subgrade during compaction and the subgrade shall be sufficiently moist prior to placing concrete mortar to prevent absorption.

660.03.02 Placing. Prior to placing slope paving for use in the work, the Contractor shall construct sufficient test panels to assure the Engineer that the proper color has been obtained and the final panel shall be at least 4' x 6' in size. The panels shall be constructed at the construction site and shall be placed by a method to be used in placing slope pavement.

The Engineer shall be the sole judge of compliance of the test panel construction with the requirement of these specifications.

Header boards shall be installed to conform to the grades of the slope paving, to the dimensions, spaces and layout shown on the plans.

Header boards shall be held in position with stakes of suitable size and length as shown on the plans.

A constant pressure of not less than 45 pounds per square inch shall be maintained in the placing machine where the hose length is 100 feet or less and the pressure shall be increased at least 5 pounds for each additional 50 feet of hose or fraction thereof.

Water used for hydration at the nozzle shall be maintained at a uniform pressure, which shall not be less than 15 pounds per square inch greater than the air pressure at the machine.

The nozzle shall be held at such distance and in such position that the flowing stream of material will impinge, as nearly as possible, at right angles to the surface being covered. Any deposits of loose sand shall be cut out.

The Contractor shall do this work only with experienced personnel.

Materials that have been mixed for more than 45 minutes and have not been incorporated in the work shall not be used, unless otherwise permitted by the Engineer.

Mortar shall not be placed against frosted or frozen surface. If mortar is placed during cold weather it shall be heated and protected during placing and curing as set forth in Section 501, except mortar shall be maintained at a temperature of not less than 50° F. for 72 hours after placing and at not less than 40° F. for an additional four days.

The ditch lining and slope paving shall be constructed without expansion joints. Suitable forms shall be used where necessary to insure a full dimension as shown on the plans at the perimeter of the lining.

The mesh reinforcing shall be placed so as to be in the approximate center of the pneumatically placed concrete mortar. All joints shall be lapped six (6) inches and run continuously throughout paving or between headers.

After the work is completed, the Contractor shall remove all debris from the work.

660.03.03 Finishing. After the mortar has been placed as nearly as practicable to the required depth, the surface shall be checked with a straightedge, and any low spots or depressions shall be brought up to proper grade by placing additional mortar in such a manner that the finished surface will be reasonably smooth and uniform for the type of work involved.

Loose areas of air-blown mortar shall be removed and replaced by the Contractor at his expense.

The surface finish of the exposed slope paving shall be the equivalent of a wood float finish.

Immediately after completion, the surface shall be covered with wet burlap or wet cotton mats and these kept wet for at least seventy-two (72) hours. When approved by the Engineer, mortar may be cured by the use of waterproof paper or by means of a liquid membrane, all conforming to the requirements as set forth in Section 702 of the Standard Specifications and these specifications.

METHOD OF MEASUREMENT

660.04.01 Measurement. Pneumatically placed concrete mortar will be measured in square yards of the actual surface covered to the depth shown on the plans.

BASIS OF PAYMENT

660.05.01 Payment. The quantity, measured as provided above, will be paid for at the contract unit price bid per square yard for "Pneumatically Placed Concrete Mortar (____-inch depth)", which payment shall be full compensation for excavation, backfill, furnishing and installing redwood headers, color pigment, and mortar, and all labor, tools, equipment and incidentals, and for doing all the work involved in placing the pneumatically placed mortar (including sub-grade preparation forms and curing), complete in place, as shown on the plans, and as specified herein, and as directed by the Engineer.

Mesh reinforcement shall be measured and paid for as specified in Section 505 of the Standard Specifications.

Note: If the Contractor elects to place the slope paving by other methods approved by the Engineer, the method of measurement and basis of payment will not be changed.

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DIVISION 3

MATERIAL DETAILS

SECTION 702 - CONCRETE CURING MATERIALS AND ADMIXTURES

702.03.01 Curing Materials. Change the tests for the following materials as they appear in this subsection to read as follows:

Liquid Membrane-Forming Compounds for Curing Concrete----------ASTM C 309*

Plastic Sheeting----------ASTM C 171

Pigmented Curing Compound for Portland Cement----------ASTM C 309*,**

White Polyethylene Sheeting (film) for Curing Concrete-------ASTM C 171

702.03.03 Air-Entraining Admixtures. Change this subsection to read as follows:

Air-entraining admixtures shall conform to the requirements of ASTM C 260.

702.03.04 Admixtures Other Than Air-Entraining. Change this subsection to read as follows:

These admixtures shall meet the requirements of ASTM Designation C494 and shall be clearly marked as to Type A, B, C, D, or E. In addition to these requirements, the admixtures may be tested by test method number Nev. T467. The concrete so tested and containing admixtures shall not exceed a change in length as specified in subsection 501.02.03.

702.03.05 Calcium Chloride. Delete this subsection of the Standard Specifications.

Add the following subsections:

702.03.07 White Pigmented Curing Compound. White pigmented curing compound shall conform to the following provisions:

Composition:

Vehicle Ingredients	Parts by Weight
Petroleum Hydrocarbon Resin[1]	230.0
Limed Wood Rosin[2]	76.7
Mineral Spirits TT-T-291, Grade 1	376.0
Pigment Ingredients	
Titanium-Calcium Pigment, MIL-T-15195	200.0

Characteristics:

Pigment by weight, percent	22.0	Min.
Weight per gallon in pounds at 77°F.	8.6	Min.
Volatiles, by weight, percent	43.2	Max.
Viscosity at 77°F., K.U.	61.	Max.
Fineness of grind, Hegman	5.	Min.
Daylight Reflectance, percent (ASTM E97)	60.	Min.
Dry Time on concrete:		
Set to touch, hours at 77° F.	2	Max.
Dry through, hours at 77° F.	4	Max.
Water Retention, grams net loss at 24 hours[3]	6	Max.

[1]Specific gravity 1.04 - 1.07; softening point (ASTM D36) 215-225° F.; color (Gardner) 11 max.; iodine number wijs 100 max.; acid number 0-2; saponification number 0-2.

[2]Color WG-WW, acid number 72-74; softening point (ASTM D36) 265-275° F., capillary tube melting point 235° F., ash (as CaO) 4%; specific gravity at 77° F. 1.09; lime Ca(OH)2 added 5.5%.

[3]Test Method No. California 534 except that the compound shall be applied at a rate of one gallon per 250 sq. ft.

The Contractor shall furnish the Engineer with a certificate of compliance executed by the manufacturer of white pigmented curing compound. Such certificate shall attest that the curing compound as produced in the usual course of the manufacturer's trade, conforms to the requirements of these specifications.

702.03.08 White Pigment Curing Compound - Chlorinated Rubber Base. White Pigmented Curing Compound--Chlorinated Rubber Base shall conform to the following provisions:

Composition:

Vehicle Ingredients

	Lbs./100 Gals.
Chlorinated Triphenyl Resin[1]	66.0
Chlorinated Paraffin, MIL-C-429, Type I, (41-43% Cl_2)	66.0
Chlorinated Rubber[2]	165.4
Ethylene Glycol Monoethyl Ether Acetate, MIL-E-7125	411.1
Toluene, TT-T-548	84.1
Normal Butyl Acetate, TT-B-838	86.6
Epoxy Resin[3]	1.7

Pigment Ingredients

Titanium Dioxide, TT-P-442, Types III or IV	66.0

[1] A yellow brittle chlorinated triphenyl resin, Color NPA 2.0 maximum; acid number 0.05; density 13.91 pounds per gallon; distillation range 280-335° C. at 5 mm. Hg; softening point 98-105.5° C.; and a refractive index of 1.660-1.665; percent chlorine, 58.5-60.6.

[2]

Chlorine, percent	65-68
Viscosity, 20% in Toluene, Centipoises at 25° C.	9-14
Specific Gravity	1.555 to 1.565
Index of Refraction	1.550 to 1.560

A 25% concentration in toluene shall show no haziness or turbidity, and when stored for one week at 77° F., shall not corrode the tin plate in a covered tin-coated can.

[3] Liquid, color 5 max. (Gardner), viscosity 100-160 poises at 25° C., epoxide equivalent 180-195.

Characteristics of Finished Material:

Pigment by Weight, percent	6.8	Min.
Weight per gallon in pounds at 77° F.	9.2	Min.
Nonvolatiles, by weight, percent	38.1	Min.
Fineness of grind, Hegman	4	Min.
Viscosity at 77° F., K.U.	60	Max.
Daylight Reflectance, percent (ASTM C 309)	60	Min.
Drying Time, on concrete:		
Set to touch, hours at 77° F.	2	Max.
Dry through, hours at 77° F.	4	Max.
Water Retention, grams net loss at 24 hours[1]	6	Max.

[1]Test Method No. Calif. 534, except that the compound shall be applied at a rate of one gallon per 300 square feet.

The Contractor shall furnish the Engineer with a certificate of compliance executed by the manufacturer of white pigmented curing compound--chlorinated rubber base. Such certificate shall attest that the curing compound as produced in the usual course of the manufacturer's trade, conforms to the requirements of these specifications.

SECTION 703 - BITUMINOUS MATERIALS

703.03.02 Asphalt Cements. Change this subsection as follows:

TABLE I - Specifications for Asphalt Cement Road Materials as well as the schedule of demerits, all as they appear in this subsection of the Standard Specifications, are hereby deleted and the following shall be used.

TABLE I - SPECIFICATIONS FOR ASPHALT CEMENT ROAD MATERIALS

TEST	NEV. TEST METHOD	GRADE; REQUIREMENTS 40-50	60-70	85-100	120-150	200-300	ALLOWABLE TOLERANCE
*Flash Point (P.M.C.T. °F. Min.)--------	T714	460	450	440	425	400	15°F. below
*Flash Point (C.O.C. °F. Min.)----------	T716	460	450	440	425	400	15°F. below
Penetration of Bituminous Matls. (original sample at 77°F.)----------	T717	40-50	60-70	85-100	120-150	200-300	4 Percent**
Thin Film Oven Test (loss on heating, 5 hr. at 325°F., percent max.)-------	T718****	0.75	0.80	0.85	1.00	1.50	20 Percent**
Rolling Thin Film Oven Test----------	T728****	0.75	0.80	0.85	1.00	1.50	20 Percent**
Penetration of Bituminous Matls. (pen. after loss at 325°F., percent of orig. pen., min.)----------	T717	52	50	47	44	40	4 Percent**
Ductility of Bituminous Matls. (Ductility at 77°F., cm. after loss at 325°F., min.)----------	T720	50	50	75	75	75	None
Penetration of Bituminous Matls. (penetration ratio) Pen. 39.2°F. --200 gm. --1 Min. / Pen. 77°F. --100 gm. --5 secs. x 100--	T717	25 min.	25 min.	25 min.	25 min.	25 min.	None
Saybolt Viscosity (furol viscosity at 275°F.)----------	T721	120-430	100-325	85-260	70-210	50-150	None
Proportion of Bitumen Soluble in Trichlorethylene (percent min.)------	T710	99	99	99	99	99	.13 Percent below Min.
Spot Test of Asphaltic Matls. (heptane xylene equiv., percent max.)---------	T726***	35	35	35	35	35	----
Water in Petroleum Products----------	T703	0.2	0.2	0.2	0.2	0.2	None

*In case of off-grade asphalt as determined by Test Method No. Nev. T716, Test Method No. Nev. T714 shall be used as an alternate test. When both T716 and T714 Test Methods show failing results, the material shall be subject to liquidated damages as hereinafter described.

**When tolerances are expressed in terms of percent, the allowable deviation is calculated as the indicated percentage of the upper or lower specification limit, whichever is applicable.

***Normal spot test and glass plate test repeated at end of twenty-four (24) hour period will not be required.

****Either Test Method T718 or T728 may be used for loss on heat. Method to be determined by the Engineer.

Asphalt cement not conforming to the requirements of Table I will be assessed demerits in accordance with the graduated increments of the following schedule. Attention is directed to subsection 109.02, "Scope of Payment", where demerits will be evaluated for damages sustained by reason of any noncompliance.

TEST METHOD	INCREMENT	DEMERITS (each increment of noncompliance)
Nev. T714	5 degrees below min.	1
Nev. T716	5 degrees below min.	1
Nev. T717	0.2 millimeter above max. or below min.	1
Nev. T718 or T728	0.01 percent above max.	1
Nev. T717	0.1 millimeter above max. or below min.	1
Nev. T720	5 centimeters below min.	2
Nev. T717	2 percent below min.	1
Nev. T721	1 sec. below min. or above max.	1
Nev. T710	0.01 percent below min.	1
Nev. T726	5 percent above max.	1
Nev. T703	0.1 percent above max.	1

703.03.03 Liquid Asphalts. TABLE II - Rapid Curing Products, TABLE III - Medium Curing Products and TABLE IV - Slow Curing Products as well as the schedule of demerits, all as they appear in this subsection of the Standard Specifications, are hereby deleted and the following shall be used.

TABLE II - RAPID CURING PRODUCTS

TEST	NEVADA TEST METHOD	GRADES RC-70	RC-250	RC-800	RC-3000	ALLOWABLE TOLERANCE
		REQUIREMENTS				
Flash Point with Tagliabue Open Cup (%°F.)	T 709	---	80 Min.	80 Min.	80 Min.	15°F. Below
Kinematic Viscosity of Asphalt (at 140°F., cs.)	T 705	70-140	250-500	800-1600	3000-6000	1.5%*
Distillation of Cut-Back Asphalt Products (percent of total distillate to 680°F.)						
to 374°F.	T 706	10 Min.	---	---	---	1.0
to 437°F.		50 Min.	35 Min.	15 Min.	---	1.0
to 500°F.		70 Min.	60 Min.	45 Min.	25 Min.	1.0
to 600°F.		85 Min.	80 Min.	75 Min.	70 Min.	1.0
(Residue from distillation to 680°F., Volume % by difference)		55 Min.	65 Min.	75 Min.	80 Min.	1.0
Penetration of Bituminous Materials (Residue from distillation 77°F. 100 g., 5 sec.) 0.1 mm	T 717	80-120	80-120	80-120	80-120	8%*
Ductility of Bituminous Materials (77°F., cms.)	T 720	100 Min.	100 Min.	100 Min.	100 Min.	None
Proportion of Bitumen Soluble in Trichlorethylene Percent Min.	T 710	99.5 Min.	99.5 Min.	99.5 Min.	99.5 Min.	.13% Below Min.
Water in Petroleum Products and Other Bituminous Materials (%)	T 703	0.2 Max.	0.2 Max.	0.2 Max.	0.2 Max.	None

*When tolerances are expressed in terms of percent, the allowable deviation is calculated as the indicated percentage at the upper or lower specification limit, whichever is applicable.

TABLE III - MEDIUM CURING PRODUCTS

TEST	NEVADA TEST METHOD	GRADES MC-70	MC-250	MC-800	MC-3000	ALLOWABLE TOLERANCE
		REQUIREMENTS				
Flash Point with Tagliabue Open Cup (°F.)	T 709	100 Min.	150 Min.	150 Min.	150 Min.	15°F. Below
Kinematic Viscosity of Asphalt (at 140°F., cs.)	T 705	70-140	250-500	800-1600	3000-6000	1.5%*
Distillation of Cut-Back Asphalt Products (Percent of total distillate to 680°F.)						
to 437°F.	T 706	20 Max.	0-10	---	---	1.0
to 500°F.		20-60	15-55	35 Max.	15 Max.	1.0
to 600°F.		65-90	60-87	45-80	15-75	1.0
(Residue from distillation to 680°F., Volume % by difference)		55 Min.	67 Min.	75 Min.	80 Min.	1.0
Penetration of Bituminous Materials (Residue from distillation 77°F. 100 g., 5 sec.)	T 717	120-250	120-250	120-250	120-250	8%
Ductility of Bituminous Materials (77°F., cms.)	T 720	100 Min.	100 Min.	100 Min.	100 Min.	None
Proportion of Bitumen Soluble in Trichlorethylene Percent Min.	T 710	99.5 Min.	99.5 Min.	99.5 Min.	99.5 Min.	.13% Below Min.
Water in Petroleum Products and Other Bituminous Materials (%)	T 703	0.2 Max.	0.2 Max.	0.2 Max.	0.2 Max.	None

*When tolerances are expressed in terms of percent, the allowable deviation is calculated as the indicated percentage at the upper or lower specification limit, whichever is applicable.

TABLE IV - SLOW CURING PRODUCTS

TEST	NEV. TEST METHOD	GRADE; REQUIREMENTS SC-70	SC-250	SC-800	SC-3000	ALLOWABLE TOLERANCES
Flash Point (C.O.C.) °F.----------	T716	150 Min.	175 Min.	200 Min.	225 Min.	15°F. below
Kinematic Viscosity @ 140°F., CS---	T705	70-140	250-500	800-1600	3000-6000	1.5 Percent**
Distillation						
Total Dist. to 680°F., Vol. Percent----------	T706	10-30	4-20	2-12	5 Max.	1.0
Kinematic Viscosity @ 140°F., S----	T705	4-70	8-85	20-140	40-350	1.5 Percent**
Residue of Spec. Pen. (percent duct. of 100 pen.)----------	T713	50 Min.	60 Min.	70 Min.	80 Min.	----
Ductility of Asphalt Residue at 77°F., cm----------	T720	100 Min.	100 Min.	100 Min.	100 Min.	None
Solubility in Trichlorethylene, Percent----------	T710	99.5 Min.	99.5 Min.	99.5 Min.	99.5 Min.	.13 Percent below Min.
Water in Petroleum Products & Other Bitum. Matls., Percent----	T703	0.5 Max.	0.5 Max.	0.5 Max.	0.5 Max.	None

**When tolerances are expressed in terms of percent, the allowable deviation is calculated as the indicated percentage at the upper or lower specification limits, whichever is applicable.

Liquid asphalts not conforming to the requirements of Tables II, III, and IV will be assessed demerits in accordance with the graduated increments of the following schedule. Attention is directed to Subsection 109.02 "Scope of Payment", where demerits will be evaluated for damages sustained by reason of any non-compliance.

NEVADA TEST METHOD	INCREMENT	DEMERITS (each increment of non-compliance)
T 716	5 degrees below min.	1
T 709	5 degrees below min.	1
T 705	RC - MC - SC - 70 2 centistokes*	1
	RC - MC - SC - 250 10 centistokes*	1
	RC - MC - SC - 800 50 centistokes*	1
	RC - MC - SC - 3000 100 centistokes*	1
	*above max. or below min.	
T 706	5% below min. or above max. per fraction	1
T 717	0.1 millimeter above max.	1
	0.1 millimeter below min.	1
T 720	5 centimeter below min.	2
T 710	0.01 below min.	1
T 703	0.1% above max.	1

TABLE V - SPECIFICATIONS FOR CATIONIC EMULSIFIED ASPHALT

Test on Emulsion	NEVADA TEST METHOD	GRADE: REQUIREMENTS Rapid Setting CRS-1	Rapid Setting CRS-2	Medium Setting CMS-2S	Medium Setting CMS-2	Slow Setting CSS-1	Slow Setting CSS-1h	ALLOWABLE TOLERANCES
Test on Emulsion[1]								
Furol Viscosity at 77°F., sec.						20-100	20-100	NONE
Furol Viscosity at 122°F., sec.	T707	20-100	100-400	50-500	50-500			NONE
Settlement, 5 days,[2] % difference	T707	5-	5-	5-	5-	5-	5-	NONE
Sieve Test (Retained on No. 20) %[3]	T707	0.10-	0.10-	0.10-	0.10-	0.10-	0.10-	NONE
Aggregate Coating-Water Resistance Test[4]	T707							
Dry Aggregate (Job) % Coated				80+	80+			NONE
Wet Aggregate (Job) % Coated				60+	60+			NONE
Cement Mixing Test, %	T707					2-	2-	NONE
Particle Charge Test	T707	Positive	Positive	Positive	Positive			NONE
pH						6.7-	6.7-	NONE
Distillation Residue, % by Weight	T707	60+	65+	60+	65+	57+	57+	1.0
Oil Distillate,[5] % by volume of Emulsion	T707	3-	3-	20-	12-			NONE
Test on Residue								
Penetration, 77°F., 100g., 5 sec.	T717	80-250	80-250	100-250	100-250	100-200	40-90	15 percent
Solubility in Trichlorethylene	T710	97.0+	97.0+	97.0+	97.0+	97.0+	97.0+	.13 percent below min.
Ductility, 77°F., cm.	T720	40+	40+	40+	40+	40+	40+	NONE

1 All tests shall be performed within 30 days from the date of emulsion shipment.

2 The test requirement for settlement may be waived when the emulsified asphalt is used in less than 5 days; or the purchaser may require that the settlement test be run from the time the sample is received until it is used, if the elapsed time is less than 5 days.

3 Except that distilled water is used instead of sodium oleate solution.

4 Calcium carbonate shall not be added to the job aggregate when making the aggregate coating-water resistance test.

5 Volume of oil distillate may be determined by reading on the graduated cylinder which is used to collect total distillate.

TABLE VI - SPECIFICATIONS FOR ANIONIC EMULSIFIED ASPHALTS

TEST ON EMULSION	NEVADA TEST METHOD	GRADE: REQUIREMENTS Rapid Setting RS-1	Rapid Setting RS-2	Medium Setting MS-2	Slow Setting SS-1	Slow Setting SS-1h	ALLOWABLE TOLERANCES
Tests on Emulsion[1]							
Furol Viscosity at 77°F., sec.		20-100		100+	20-100	20-100	NONE
Furol Viscosity at 122°F., sec.			75-400				NONE
Residue from Distillation, % by Weight	T707	57+	62+	62+	57+	57+	1.0
Settlement, 5 days, % Difference		3-	3-	3-	3-	3-	NONE
Demulsibility							
35 ml. of 0.02 N. $CaCl_2$%		60+	50+				NONE
50 ml. of 0.10 N. $CaCl_2$%				30-			NONE
Sieve Test (Retained on No. 20) %		0.10-	0.10-	0.10-	0.10-	0.10-	NONE
Cement Mixing Test, %					2.0-	2.0-	NONE
Tests on Residue							
Penetration, 77°F., 100 g. 5 sec.	T717	100-200	100-200	100-200	100-200	40-90	15 percent
Solubility in Trichlorethylene, %[2]	T710	97.5+	97.5+	97.5+	97.5+	97.5+	13 percent below min.
Ductility, 77°F., cms.	T720	40+	40+	40+	40+	40+	NONE

[1] All tests shall be performed within 30 days from the date of emulsion shipment.

[2] Alternatively, trichloroethylene (not trichloroethane) may be used as the solvent for determining solubility. In case of dispute, however, carbon tetrachloride will be used as the referee solvent.

Emulsified Asphalt not conforming to the requirements of Tables V & VI will be assessed demerits in accordance with the graduated increments of the following schedule. Attention is directed to Subsection 109.02, "Scope of Payment", where demerits will be evaluated for damages sustained by reason of any non-compliance.

TEST METHOD	INCREMENT	DEMERITS (each increment of noncompliance)
Nev. T707 (Furol Viscosity @ 77°F., & @ 122°F.)	2 seconds above max. or below min.	1
Nev. T707 (Settlement, 5 days, % difference)	1.0% above max.	1
Nev. T707 (Sieve test, % max.)	0.10% above max.	1
Nev. T707 (Cement mixing test)	0.5% above max.	1
Nev. T707 (Particle charge test)	Negative charge	21
Nev. T717 (Penetration, 77°F., 100g., 5 sec.)	0.1 millimeter above max. or below min.	1
Nev. T710 (Solubility)	0.01 below min.	1
Nev. T720 (Ductility 77°F., cm.)	5 centimeters below min.	2

SECTION 704 - BASE AGGREGATES

704.03.01 Drain Backfill. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve		
	Type 1	Type 2	Type 3
2	100		
1-1/2	90-100		
1		100	
3/4	50-80	90-100	
3/8		20-55	100
# 4	24-40	0-10	60-90
# 16	10-24		26-60
# 100	0-4	0-4	0-4
# 200	0-2	0-2	0-2

Unless otherwise specified in the contract documents the Contractor may use either Type 1, 2 or 3.

	Type 1	Type 2	Type 3
Source Requirement Test:			
Test Method Nev. T232			
Degradation Passing No. 20, Max.	25%	25%	25%
Height, Inches, Max.	2.5	2.5	2.5

704.03.02 Type 1 Class A Aggregate Base. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve
1-1/2 Inch	100
1 Inch	80-100
No. 4	30-65
No. 16	15-40
No. 200	2-12

Project Control Test	Test Method	Requirements
Sieve Analysis	Nev. T206	Above
Sampling Aggregate	Nev. T200	---
Fractured Faces	Nev. T230	35 Percent Min.
Plasticity Index	Nev. T212	Table 1
Liquid Limit	Nev. T210	35 Max.

Source Requirement Tests	Test Method	Requirements
Resistance (R Value)	Nev. T115	70 Min.
Percentage of Wear (500 Rev.)	Nev. T233	45 Percent Max.

704.03.03 Type 1 Class B Aggregate Base. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve
1-1/2 Inch	100
1 Inch	80-100
No. 4	30-65
No. 16	15-40
No. 200	2-12

Project Control Test	Test Method	Requirements
Sieve Analysis	Nev. T206	Above
Sampling Aggregate	Nev. T200	---
Fractured Faces	Nev. T230	15 Percent Min.
Plasticity Index	Nev. T212	Table 1
Liquid Limit	Nev. T210	35 Max.

Source Requirement Tests	Test Method	Requirements
Resistance (R Value)	Nev. T115	70 Min.
Percentage of Wear (500 Rev.)	Nev. T233	45 Percent Max.

704.03.04 Type 2 Class A Aggregate Base. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve
1 Inch	100
3/4 Inch	90-100
No. 4	35-65
No. 16	15-40
No. 200	2-10

Project Control Tests	Test Method	Requirements
Sieve Analysis	Nev. T206	Above
Sampling Aggregate	Nev. T200	---
Crushed Particles	Nev. T230	90 Percent Min.
Plasticity Index	Nev. T212	Table 1
Liquid Limit	Nev. T210	35 Max.

Source Requirement Tests	Test Method	Requirements
Resistance (R Value)	Nev. T115	78 Min.
Percentage of Wear (500 Rev.)	Nev. T233	45 Percent Max.

704.03.05 Type 2 Class B Aggregate Base. Change the tests, test method and requirements of this subsection to read as follows:

Project Control Tests	Test Method	Requirements
Sieve Analysis	Nev. T206	in Standard Specifications
Sampling Aggregate	Nev. T200	---
Fractured Faces	Nev. T230	35 Percent Min.
Plasticity Index	Nev. T212	Table 1
Liquid Limit	Nev. T210	35 Max.

Source Requirement Tests	Test Method	Requirements
Resistance (R Value)	Nev. T115	70 Min.
Percentage of Wear (500 Rev.)	Nev. T233	45 Percent Max.

SECTION 705 - AGGREGATES FOR BITUMINOUS COURSES

705.03.01 Plantmix and Roadmix Bituminous Base and Surface Aggregate, Types 1, 2, and 3. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve		
	Type 1	Type 2	Type 3
1 Inch	100	100	
3/4 Inch	90-100	90-100	
1/2 Inch			100
3/8 Inch		55-85	80-100
No. 4	40-65	40-65	40-70
No. 16	15-40	15-40	20-45
No. 200	3-9	3-9	3-10

Project Control Tests	Test Method	Requirements
Sieve Analysis	Nev. T206	Above
Sampling Aggregate	Nev. T200	---
Fractured Faces	Nev. T230	50 Percent Min. for Type 2, 35 Percent Min. for Type 1 & 3
Plasticity Index	Nev. T212	6 Percent Max.
Liquid Limit	Nev. T210	35 Percent Max.

Source Requirement Tests	Test Method	Requirements
Stripping Test	Nev. T209	Satisfactory
Stabilometer Value (Type 1 & 3)	Nev. T303	30 Min.
Stabilometer Value (Type 2)	Nev. T303	35 Min.
Moisture Vapor Susceptibility (Stabilometer Value)	Nev. T312	25 Min.
Swell Test	Nev. T304	0.030" Max.
Percentage of Wear (500 Rev.)	Nev. T233	45 Percent Max.

705.03.02 Plantmix Surface Aggregate, Type 4. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve
1 Inch	100
3/4 Inch	90-100
3/8 Inch	55-85
No. 4	40-65
No. 16	15-40
No. 200	3-9

Project Control Tests	Test Method	Requirements
Sieve Analysis	Nev. T206	Above
Sampling Aggregate	Nev. T200	---
Fractured Faces	Nev. T230	90 Percent Min.
Plasticity Index	Nev. T212	6 Percent Max.
Liquid Limit	Nev. T210	30 Percent Max.

Source Requirement Tests	Test Method	Requirements
Stripping Test	Nev. T209	Satisfactory
Stabilometer Value	Nev. T303	37 Min.
Moisture Vapor Susceptibility (Stabilometer Value)	Nev. T312	30 Min.
Swell Test	Nev. T304	0.030" Max.
Percentage of Wear (500 Rev.)	Nev. T233	45 Percent Max.

705.03.03 Plantmix Bituminous Open-Graded Surface Aggregate. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve
1/2 Inch	100
3/8 Inch	90-100
No. 4	35-55
No. 16	5-18
No. 200	0-3

Project Control Tests	Test Method	Requirements
Sieve Analysis	Nev. T206	Above
Sampling Aggregate	Nev. T200	---
Fractured Faces	Nev. T230	90 Percent Min.

Source Requirement Tests	Test Method	Requirements
Stripping Test	Nev. T209	Satisfactory
Swell Test	Nev. T304	0.030" Max.
Percentage of Wear (500 Rev.)	Nev. T233	37 Percent Max.
Degradation:		
Passing No. 20 Sieve	Nev. T232	25 Percent Max.
Height, Inches	Nev. T232	2.5 Max.

705.03.05 Screenings. Change this subsection to read as follows:

Sieve Sizes	Percentage by Weight Passing Sieve	
	1/2" Size	3/8" Size
1/2 Inch	100	
3/8 Inch	90-100	100
No. 4	15-35	20-45
No. 16	0-4	0-6
No. 200	0-2	0-2

Project Control Tests	Test Method	Requirements
Sieve Analysis	Nev. T206	Above
Sampling Aggregate	Nev. T200	---
Fractured Faces	Nev. T230	90 Percent Min.

Source Requirement Test	Test Method	Requirements
Stripping Test	Nev. T209	Satisfactory
Percentage of Wear (500 Rev.)	Nev. T233	37 Percent Max.
Degradation:		
Passing No. 20 Sieve	Nev. T232	25 Percent Max.
Height, Inches	Nev. T232	2.5 Max.

SECTION 706 - AGGREGATES FOR PORTLAND CEMENT PRODUCTS

706.03.01 Coarse Aggregate. Change the Test Method for the Sieve Analysis Test to Nev. T499.

706.03.02 Lightweight Aggregate. Change the Test Method for the Sieve Analysis Test to Nev. T499. Change the 90 Percent Min. (e) requirement as determined by Test Method Nev. T472 to determine Mortar Making Properties of Sand to 95 Percent Min. (e).

Change Paragraph (e) of this subsection to read as follows:

(e) Fine Aggregate failing in the test for organic impurities (Nev. T498) may be used provided that when tested for effect of organic impurities on strength of mortar, the relative strength at 7 and 28 days calculated in accordance with (Nev. T472) is not less than 95%.

706.03.03 Fine Aggregate. Change the Test Method for the Sieve Analysis Test to Nev. T499. Change the Percent Min. (b) requirement as determined by Test Method Nev. T472 to determine Mortar Making Properties to 95 Percent Min. (b).

Change Paragraph (b) of this subsection to read as follows:

(b) Fine aggregate failing in the test for organic impurities (Nev. T498) may be used provided that when tested for effect of organic impurities on strength of mortar, the relative strength at 7 and 28 days calculated in accordance with (Nev. T472) is not less than 95%.

706.03.04 Grout and Mortar Sand. Change the Test Method for Sieve Analysis Test to Nev. T499. Change the 90 Percent Min. (a) as determined by Test Method Nev. T472 to determine Mortar Making Properties to 95 Percent Min. (a).

Change Paragraphs (a) and (b) of this subsection to read as follows:

(a) Fine aggregate failing in the test for organic impurities (Nev. T498) may be used provided that when tested for effect of organic impurities on strength of mortar, the relative strength at 7 and 28 days calculated in accordance with (Nev. T472) is not less than 95%.

(b) Aggregates tested and showing color darker than the Standard shall be rejected unless they pass the mortar making properties test (Nev. T472).

706.03.05 Stone for Masonry and Riprap. Change this subsection to read as follows:

Source Requirement Tests	Test Method	Requirements
Percentage of Wear (500 Rev.)	Nev. T233	37 Percent Max.
Degradation:	Nev. T232	
Passing No. 20		25 Percent Max.
Height, Inches		2.5 Max.
Specific Gravity	Nev. T111	2.50 Min.

SECTION 707 - JOINT MATERIAL

707.03.01 Joint Fillers. This subsection of the Standard Specifications is hereby changed to read as follows:

> Preformed fillers for joints shall conform to the requirements of AASHO M 213, ASTM D 1751, Fiber Type, and shall be punched to admit the dowels where called for on the plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint unless otherwise authorized by the Engineer. When the use of more than one piece is authorized for a joint, the abuting ends shall be fastened securely and held accurately in place, by stapling or other positive fastening satisfactory to the Engineer.

707.03.03 Waterstops. The Test Method for the "Test for Indentation of Rubber by Means of a Durometer" as specified in this subsection of the Standard Specifications is hereby changed to read ASTM D 2240.

707.03.04 Pourable Joint Sealer. The joint sealer for bridges shall be modified poly-sulfide polymer consisting of 2 components to be uniformly mixed and pour directly into the joints. The weight of Component A in the mixture shall be not less than 10 percent of the weight used of Component B. The polysulfide content, after mixing the 2 components, shall be 20 percent by weight, minimum.

Upon opening, Component B shall not exhibit more than a slight degree of skinning.

The joint sealer shall comply with the following requirements when tested in accordance with Test Method No. Calif. 413 of the California Division of Highways:

Properties of Laboratory Mixed Material

Determination	Requirements
Viscosity, 5 minutes after mixing, poise	200 to 350
Application time (pot life or time to reach 2000 poise at 77° F.), hours	1 Min.
Penetration at 77° F. after 24 hours aging at 77° F.	150 Max.
(1) Penetration at 77° F.	50 to 120
(1) Penetration at 158° F.	175 Max.
(1) Resilience at 77° F., percent	70 Min.
(2)	60 Min.
(1) Resilience at 158° F., percent	60 Min.
(2)	50 Min.
Resilience of oven-aged sample at 7 days, percent	70 Min.
(1) Bond to concrete, 100% extension, dry at -20° F.	No failure
(1) Bond to concrete, 50% extension, wet, at -20° F.	No failure
Non-volatile content, percent	88 Min.

(1) After 96 hours aging at 77° F.
(2) This requirement applied if the penetration at 77° F., after 96 hours aging at 77° F., is 100 to 120.

The Contractor shall furnish the Engineer with a certificate of compliance executed by the manufacturer of pourable joint sealer. Such certificate shall attest that the pourable joint sealer as produced in the usual course of the manufacturer's trade, conforms to these specifications.

SECTION 709 - METAL PIPE AND DRAINS

709.03.01 Corrugated Metal Pipe and Pipe Arches. Change this subsection to read as follows:

These conduits and the coupling bands shall conform to the requirements of AASHO M36-68I for the specified sectional dimensions and spelter coating. Shop-formed elliptical pipe and shop strutted pipe shall be furnished where specified.

Special Sections, such as elbows, tees and wyes for these conduits shall be of the same gage as the conduit to which they are joined, and shall conform to applicable requirements of AASHO M36-68I.

When metal end sections are required, the following requirements shall pertain.

(a) Metal end sections shall be of the gage shown on the plans.

(b) The end of the pipe shall be finished with annular corrugations to conform to metal end section so that no leakage re-

sults from the connection; however, other designs may be used if approved by the Engineer.

(c) Where connector sections are used the connector section shall be helical or annular as required to match the type of pipe used.

Gages of conduits and coupling bands shall conform to Table 1.

TABLE 1
PIPE REQUIREMENTS

Nominal Inside Diameter	Gage[a, b]
Inches	
6	18
8	16
10	16, 14
12	16, 14
15	16, 14, 12
18	16, 14, 12
21	16, 14, 12
24	16, 14, 12, 10
30	16, 14, 12, 10, 8
36	16, 14, 12, 10, 8
42	16, 14, 12, 10, 8
48	16, 14, 12, 10, 8
54	14, 12, 10, 8
60	12, 10, 8
66	12, 10, 8
72	10, 8
78	8
84	8
90	8
96	8

[a]Unless noted otherwise, the lightest gage listed for a specified diameter may be furnished.

[b]Connecting bands may be two gages lighter than that used for pipe but not more than 12 gage nor less than 18 gage.

Nominal Thickness in Inches	0.048	0.060	0.075	0.105	0.135	0.164
Equivalent U.S. Gage No.	18	16	14	12	10	8

SECTION 713 - REINFORCEMENT

713.03.01 Bar Steel Reinforcement. Change this subsection to read as follows:

Test	Test Method	Requirements
Deformed Billet-Steel Bars for Concrete Reinforcement	ASTM A615	Grade 40, 60 (a)
Axle-Steel Deformed Bars for Concrete Reinforcement	ASTM A617	Grade 40, 60 (a)
Spiral Reinforcement	ASTM A615	Grade 60 (a)

(a) With the following exception: If Reinforcing Steel Bars fail to meet the minimum unit stress when calculated on the basis of ASTM A615 Section 10.1.3, the material may be considered acceptable if minimum specification requirements are satisfied by computing the unit stress "Section Area" Method described in Nevada Test Method T484.

Add the following subsection:

713.03.05 Cold-Drawn Steel Wire for Spiral Reinforcement. This steel shall conform to the requirements of ASTM A82.

SECTION 714 - PAINT

714.03.01 Iron and Steel Use Items. Add the following:

In addition to sub-paragraphs (a) and (b) of this subsection of the Standard Specifications, the Contractor may choose from SSPC (Steel Structures Painting Council) Alkyd Paint System Specification 2.00, Phenolic Paint System 3.00 or Vinyl Paint System 4.00.

The Contractor shall submit to the Engineer for approval a letter indicating his choice of system, accompanied by certificates attesting that the ingredients chosen meet the applicable specifications and requirements prior to application of any paint.

SECTION 716 - SIGN MATERIALS

716.03.01 General. Change this subsection to read as follows:

Bearing plates and gusset or stiffener plates shall be of the sizes and dimensions shown on the plans and shall be galvanized after fabrication. Steel shall conform to ASTM Designation: A 36. Galvanizing shall conform to ASTM Designation: A 123. All welding shall conform to the requirements set forth in subsection 506.03.02, "Welding".

All bolts, nuts, clamps and metal washers shall be of structural, carbon steel conforming to Section 710 of the Standard Specifications and may be galvanized or cadmium plated as hereinafter stated.

Anchor bolts, nuts and washers shall be of structural carbon steel conforming to Section 710, "Structural and Eyebar Steel", and shall be galvanized in accordance with ASTM Designation: A 153, or Cadmium plated in accordance with ASTM Designation: A 165 Type TS. The top portion of anchor bolts shall be galvanized or cadmium plated to such extent that the galvanized or cadmium plated portion will extend at least two (2) inches into concrete. Anchor bolts shall be of the size, shape and length as shown on the plans.

Metal chosen for use shall be weldable and shall have a minimum yield of 35,000 PSI.

Steel pipe for posts shall conform to the specifications of ASTM Designation: A 120 and shall be galvanized.

Aluminum alloy pipe for posts and tubular stiffeners shall be schedule 40 pipe fabricated of 6061-T6 aluminum alloy and shall conform to the specifications of ASTM Designation: B 241. Pipe caps for aluminum posts shall be aluminum alloy 356-T6.

Galvanized steel pipe posts or aluminum alloy pipe posts shall be of the diameter and length shown on the plans. The top of the posts shall be fitted with a cover. Posts showing damage shall be repaired or rejected.

The straps, bars and braces used on single support signs shall be of aluminum alloy 6061-T6 and shall conform to ASTM Designation: B 209.

Stringers for horizontal supporting structural members shall be of 6061-T6 or 6062-T6 aluminum alloy and shall conform to ASTM Designation: B 308, Alloy GS11A.

Sheet aluminum for sign panels and backing for letters other than laminated signs shall be of 0.125 inch aluminum alloy alclad 5155-H36 or 6061-T6 and shall conform to specifications for ASTM Designation: B 209. Laminated signs shall be of 6061-H12 aluminum alloy. The back sheet shall be fabricated in one piece from 0.040 inch sheet aluminum alloy 3003-H14. The surface shall be treated with an amorphous chromate conversion coating conforming to the requirements of Federal Specification MIL-C-5541.

All bolts, nuts, clamps and metal washers in contact with aluminum shall be cadmium plated. All other bolts, nuts, clamps and metal washers shall be galvanized or cadmium plated. Cadmium plating shall conform to the specifications of ASTM Designation: A 165, minimum thickness as prescribed for grade Type TS and galvanizing shall conform to the requirements of ASTM Designation: A 153.

Wood posts and braces for permanent sign supports shall be constructed of Douglas Fir, West Coast Hemlock, or any other equivalent stress rated wood material, at the option of the Contractor. Said wood material shall

be construction grade, free of heart center, minimum stress rating of 1200f, and shall be graded in accordance with the provisions contained in Section 718 of the Standard Specifications. Sweep shall not exceed 0.08 feet in 10 feet.

The expansion assembly for fastening the aluminum tubing to the aluminum Z-bars shall be manufactured of a zinc die casting alloy which contains copper, aluminum and magnesium. The anchor bolt for the expansion assembly shall be cadmium plated and shall conform to the specifications of ASTM Designation: A 165, minimum thickness as prescribed for grade Type TS.

Core material shall be phenolic impregnated cullulose honeycomb equal to AMS-3720 standards. Thickness of core material shall be held within a tolerance of plus 0.010 inch and minus 0.010 inch. Core material shall meet specification MIL-E-5272 for resistance to fungus.

The tensile strength of the 6061 aluminum sheets and honeycomb type laminate construction shall be 35-38 pounds per square inch. The tensile test shall be performed on a Dillon Dynamometer at room temperature with a two by two inch (2" x 2") section as a test specimen. The bond obtained after a forty-eight (48) hour aging period shall withstand six complete cycles of the ASTM D-1037 Weathering Test.

The materials used in the fabrication of overhead sign structures and footings shall additionally conform to the following requirements:

(1) Sign frames: Bars, plates, and shapes shall be structural steel conforming to the specifications of ASTM Designation: A 36.

(2) Sign pipe posts: Pipe posts shall be welded or seamless steel pipe conforming to the specifications of ASTM Designation: A 53, Grade B. At the option of the Contractor, posts may be fabricated from structural steel conforming to the specifications of ASTM Designation: A 36, or of ASTM Designation: A 283, Grade D, except that plates more than one inch in thickness shall be structural steel conforming to the specifications of ASTM Designation: A 373.

(3) Sign steel walkway gratings: Steel walkway gratings shall be furnished and installed in accordance with details shown on the plans and the following provisions:

    (a) Gratings shall be the standard product of an established grating manufacturer.

    (b) Material for gratings shall be structural steel conforming to the specifications of ASTM Designation: A 36.

(c) For welded type gratings, each joint shall be full resistance welded under pressure to provide a sound, completely beaded joint.

(d) For mechanically locked gratings, the method of fabrication and interlocking of the members shall be approved by the Engineer, and the fabricated grating shall be equal in strength to the welded type.

(e) After fabrication, gratings shall be hot-dip galvanized.

(f) Gratings shall be accurately fabricated and free from warps, twists, or other defects affecting their appearance or serviceability. Ends of all rectangular panels shall be square. The tops of the bearing bars and cross members shall be in the same plane. Gratings distorted by the galvanizing process shall be straightened.

(4) Bolts and Nuts: Bolts and nuts shall conform to the specifications of ASTM Designation: A 307. Bolted connections shall conform to the provisions in subsection 506.03.10, "Bolts and Bolted Connections".

SECTION 718 - TIMBER

718.03.02 Grades. Add the following:

The West Coast Lumber Inspection Bureau and the Western Wood Products Association grading rules shall be included as grading rules which may be used. Grading rules in effect on the date of advertisement of bids shall govern.

Guardrail posts and blocks shall meet the following requirements:

Douglas Fir or Western Larch shall conform to the requirements for "No. 1 Structural", grade as set forth in paragraph 131-b of the grading rules of the West Coast Lumber Inspection Bureau or paragraph 80.11 of the grading rules of the Western Wood Products Association.

West Coast Hemlock shall conform to the requirements for "Select Structural", grade as set forth in paragraph 131-a of the grading rules of the West Coast Lumber Inspection Bureau or paragraph 80.10 of the grading rules of Western Wood Products Association.

SECTION 720 - GUARDRAIL MATERIALS

Add the following subsection:

720.03.04 Cable End Anchor Assemblies. Cable end anchor assemblies for metal beam guard railing shall conform to the following provisions:

The anchor plate, 8WF17, and metal plates shall be fabricated of steel conforming to the specifications of ASTM Designation: A 36.

The anchor rod shall be fabricated of steel conforming to the specifications of ASTM Designation: A 575 or A 576, Grade 1020. The eye may be drop forged or formed with a full penetration weld. The eye shall develop 100 percent of the rod strength.

All bolts and nuts shall conform to the specifications of ASTM Designation: A 307, and be galvanized in accordance with the provisions in Section 715.

Anchor cable shall be 3/4-inch preformed, 6 x 19, wire strand core or independent wire rope core (IWRC), galvanized, right regular lay, manufactured of improved plow steel with a minimum breaking strength of 21.4 tons. Two certified copies of mill test reports of each manufactured length of cable used shall be furnished to the Engineer.

Thimbles shall be commercial quality, galvanized steel. Cable clips shall be commercial quality drop forged galvanized steel.

The swaged fitting and stud assembly shall be of steel conforming to the requirements of American Iron and Steel Institute Designation: C 1035, and shall be annealed, galvanized, suitable for cold swaging. The swaged fitting and stud assembly shall develop 100 percent of the breaking strength of the cable.

One sample of cable properly fitted with swaged fitting and right hand thread stud at both ends as specified above, 3 feet in total length, shall be furnished the Engineer for testing.

SECTION 722 - WATER

722.03.01 Concrete Use. Change the first paragraph of this subsection to read as follows:

Samples submitted for tests shall each consist of two (2) quarts of water, obtained and shipped in clean glass containers carefully packed and labeled. Tests shall be made in accordance with AASHO Designation: T 26, Standard Method of test for quality of water to be used in concrete.

SECTION 724 - FENCE MATERIALS

724.03.01 Wood Posts. Add the following:

All posts and braces shall be pressure treated with Creosote, Creosote-Coal Tar solution or Pentachlorophenol solution in accordance with Section 719 of the Standard Specifications and modifications contained in these specifications.

The minimum weight of Pentachlorophenol solution retained per cubic foot of post shall be six (6) pounds. Pentachlorophenol solution shall consist of five percent (5%) pure Pentachlorophenol in light petroleum.

All posts and braces shall be treated with the same type of preservative.

724.03.02 Metal Posts. Add the following:

The following heading shall apply to the table shown on page 728 of the Standard Specifications:

"For Chain-Link Fence 72 Inches and Less"

Gate posts for standard Type A fencing shall be as set forth in the Standard Specifications for chain link fence except that for single gates over 13 feet to 18 feet the posts shall be pipe, 3.960 O.D. (min.) weighing not less than 8.65 lbs. per lin. ft.

Metal posts (other than tubular) shall be manufactured of steel conforming to Federal Commercial Standard CS 184-51 or ASTM Designation: A 283 or A 306. Metal posts (other than tubular) shall be manufactured to the tolerances and workmanship as provided in Federal Commercial Standard CS 184-51.

Line posts shall be provided with tapered anchor plates attached securely thereto. The anchor plates shall weigh not less than 0.67 pound and have a minimum area of 15 square inches. The top edge of the anchor plate shall be from 22 to 26 inches above the bottom end of the line post for Type A fence. The anchor plate may be omitted provided the post is set in concrete. Each post shall be furnished with galvanized wire clamps as follows: one clamp for each strand of barbed wire, and clamps for the top, bottom and at not more than 14-inch intervals between top and bottom for mesh fencing.

724.03.03 Barbed Wire. Add the following:

Barbed wire shall be composed of two (2) strands of No. 12-1/2 gage (Stl.W.G.) wire with four (4) point barbs of fourteen (14) gage spaced not more than five (5) inches apart.

724.03.05 Chain-Link Fabric. Add the following:

The wire used in the manufacture of the fabric shall be eleven (11) gage for all fence seventy-two inches or less in height.

SECTION 726 - ROADSIDE MATERIALS

726.03.13 Masonry. Change this subsection to read as follows:

Hollow load-bearing concrete masonry blocks shall conform to the requirements of ASTM Designation: C 90.

Hollow non-load-bearing concrete masonry blocks shall conform to the requirements of ASTM Designation: C 129.

Add the following section:

SECTION 727 - CONCRETE SURFACE FINISHING MATERIAL

SCOPE

727.01.01 Materials Covered. This specification covers the types and quality of concrete surface finishing materials.

PHYSICAL PROPERTIES AND TESTS

727.02.01 Requirements. Bonded Grout Finishing Material shall conform to the following requirements:

(Except as noted herein tests shall be made in accordance with test method indicated. Federal standard test methods are as contained in Publication Fed. Test Methods St'd. No. 141.)

1. Viscosity - 110-115 K. U., using pin paddle. (Federal St'd. Method No. 4281.)

2. Total solids (Federal St'd. Method No. 4042.)
   a. By wieght - 65% min.
   b. By volume - 48% min.

3. Flexibility - Pass 1/8" mandrel when spread 12 mils wet on a tin panel, air dried 16 hours and over dried 16 hours at 120 degrees F. Panel shall show no mud cracking, or no loss in adhesion to the panel when bent. (Federal St'd. Method No. 6221.)

4. Water resistance - No softening when tested as follows: Spread a 12 mil film on tin panel, allow to air dry 48 hours. Immerse in water for 16 hours, and allow to dry for 8 hours. There shall be no effect on the material. (ASTM D1647.)

5. Weatherometer durability - Expose a 12 mil film applied to asbestos-cement board for 500 hours in an Atlas Twin-Arc weatherometer. There shall be no erosion, cracking, softening, or other visible defects in the coating. (Federal St'd. Method No. 6152.)